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Traps and Vicious Circles: A Longitudinal Analysis of Participation in the Canadian Unemployment Insurance Program

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Foreword

As we move into the second year of slow growth, unemployment in Canada is once again in double digits and expenditure under the unemployment insurance (UI) system is at an all time high. Canada's UI system is exceptional for its generosity and comprehensiveness. It is undeniably successful as a vehicle for providing economic security to temporarily unemployed workers. It has, nevertheless, frequently been criticized on several grounds. One of the most serious criticisms is that the system tends to reduce the incentive to work and to subsidize unproductive activity in parts of the country with traditionally high unemployment.

The principle goal of any unemployment insurance system is to provide workers with a secure income while they are between jobs. It is, nevertheless, generally accepted that the UI system affects the functioning of labour markets in two contradictory ways. On the one hand, the income provided by unemployment insurance provides workers with the economic freedom to search more thoroughly for a new job. The match will be more appropriate and the job more secure than they would have been if financial pressures forced workers to take the first job that came along. Improved job search and better matching implies less future unemployment and shorter spells. On the other hand, the availability of a secure source of nonlabour income acts as a disincentive to work, because the opportunity cost of unemployment is considerably reduced. It has also been argued that the system generates a dependence whereby some workers view the income from unemployment insurance as an entitlement to be drawn from at regular intervals. The work disincentive effect tends to increase the length of an unemployment spell and increase the chances that an individual who has collected unemployment insurance will collect it again.

Although there is considerable discussion about the disincentive and matching effects of the UI system, there is very little agreement as to which effect dominates. This lack of agreement can be attributed to techniques and data that cannot answer crucial questions about duration and occurrence dependence. This paper takes advantage of a new Statistics Canada database that tracks individuals over an extended period of time and answers at least some of these questions.

Miles Corak was a researcher with the Economic Council and is now with Statistics Canada. The work for this paper began as part of the Council's Unemployment Issues project under the direction of Surendra Gera and was completed at Statistics Canada.

Judith Maxwell
Chairman

Abstract

The purposes of the research reported in this paper are to describe some of the prevailing patterns of participation in the Canadian unemployment insurance (UI) program from a longitudinal perspective, to assess competing interpretations of these patterns, and to draw some implications for policy. Administrative data associated with the operation of the program that cover roughly the period 1971 to 1990 are used. These data are organized as a panel data set, by individual, in order to examine the extent and nature of repeat UI use. A great deal of repeat use is documented, and two competing interpretations are evaluated.

The factors determining the likelihood that an individual will be a repeat UI user are examined. Seasonal and industry-specific influences are important determinants, but it is also found that the young are particularly prone to make repeated use of unemployment insurance, and that those individuals who have made a claim in the past are more likely to make another in the future. Use of the UI system carries with it a certain momentum or inertia. It is also found that repeat users are not gradually weaning themselves off dependency on UI benefits. On the contrary, all other things being equal, they collect benefits for a longer and longer time with each successive claim. The most likely explanation for this pattern of use is that participation in the program erodes the stigma that may be attached to the receipt of benefits, and thereby increases reliance on the program in the future.

These results offer some information on how "active" reforms of the UI program might be targeted. In particular, it is suggested that reforming unemployment insurance from being a scheme of "passive" income support into a program of "active" payments to reintegrate claimants into a stable pattern of labour force participation should proceed according to the number of claims by the individual. The program should operate unchanged for first-time UI claimants. These individuals probably need and will make use of benefit payments as unemployment "insurance" payments. However, once an individual makes a second claim, the nature of payments should change and become active in nature. In this way, active payments will be directly targeted to those most likely to fall into a "vicious circle" of UI dependency.

Introduction

The relationship between the receipt of unemployment insurance and individual labour market behaviour has been the subject of much inquiry. There has, for example, been considerable research devoted to examining the degree to which unemployment insurance (UI) payments raise the aggregate unemployment rate, and the degree to which they lengthen individual spells of unemployment. Beach and Kaliski [1983], Ham and Rea [1987], Keil and Symons [1990], Moorthy [1990], and Phipps [1990*a*, 1990*b*] are some of the more recent studies that have addressed this issue in the Canadian context. This issue, however, does not speak directly to some recent public policy concerns. The Forget Commission, for example, stresses that the UI system is being used repeatedly by the same individuals. It suggests that some individuals are subject to a so-called "10-40 syndrome" – working for the minimum amount of time needed to qualify for benefits, collecting them for as long as possible, and then repeating the cycle [Commission of Inquiry on Unemployment Insurance 1986]. Newfoundland's Royal Commission on Employment and Unemployment claims that "the UI system encourages short-term make-work projects rather than long-term economic development, undermines work initiatives, discriminates against self-employment and discourages the formation of sound work habits and attitudes" [1986, 34]. The Economic Council of Canada [1990] echoes these views. Increasingly, the feeling in public policy circles is that over the long term, unemployment insurance has engendered a type of dependency that thwarts industrial adaptation and change, and therefore that there is a need to reform the program from a system of "passive" payments; that is, a system of income support, to a scheme of "active" assistance; that is, a system that sponsors training and labour market adjustment.

Concerns of this kind require an examination of the use of the system at the level of the individual and over time. How prevalent is repeat use of the system? How often do the same individuals use the system over time, and what individual characteristics are associated with repeat use? How should such repeat use be interpreted?

The purpose of the research reported in this paper is to explicitly examine these questions in the hope of shedding some light on the way in which the Canadian UI program interacts with the labour market. We begin by offering a descriptive overview of some longitudinal dimensions of individual participation in the program. As noted, many public policy analysts argue that the UI program should be evaluated from a longitudinal perspective. However, little work of this nature has been carried out. It is not self-evident that a great deal of repeat use will naturally be associated with the UI program. Receiving income support payments permits an unemployed individual to lengthen his or her job search. This increases the chances of finding a job

that leads to a particularly productive match between worker and employer, increases the length of employment, and consequently reduces the likelihood of repeat UI use. In this sense the system is inherently "active" in nature. It is important, therefore, to document the extent of repeat use. With the possible exception of Glenday and Jenkins [1981a, 1981*b*] and Magun [1982] – studies that are more than a decade old – this has not been done with Canadian data.

We go on to address matters of interpretation. In particular, an attempt is made to examine the extent to which participation in the program may be considered to be a "trap." The notion of a trap may be understood in at least two different ways. The first, what we shall call "neoclassical" interpretation, is based on a standard model of labour supply. In this model, well-informed utility-maximizing individuals are confronted with a stable and continuous budget constraint. The presence of unemployment insurance alters the individual's constraint and is often said to skew choices towards less employment and more leisure, which in this model means more unemployment. This reasoning forms the basis for much of the early Canadian research on the UI system – Grubel, Maki, and Sax [1975]; Green and Cousineau [1976]; Kaliski [1976]; Lazar [1978]; and Rea [1977] are some examples. Much of this work implicitly, and in some cases explicitly, adopts an annual horizon. However, if an individual decides to participate in the program in any given year for a particular length of time, and if preferences and constraints are stable, then he or she will participate for the same length of time in the next and in all succeeding years.[1] Fortin [1984] outlines a neoclassical model of labour supply that has such implications. It is the generosity of the program, in combination with heterogeneity in the preference for employment across the population, that leads to repeat use. The policy implication is that changes in the program's parameters will lead the individual to make different choices. In other words, if you restrict the amount of benefits, individuals will be more inclined to work and perhaps even to not participate in the program at all. Further, since repeat use reflects individual attributes and choices, the program should be experience-rated; and individuals who are to be repeat users should, as a result, be required to pay higher premiums.

There is an alternative view that is more historical. We shall, for the lack of a better phrase, refer to it as the "state-dependence" interpretation. It suggests that participation in the unemployment insurance program may indeed be considered a trap, but one in which preferences or constraints are not stable. Within this framework an individual's labour supply is determined by his or her past history, so there is a possibility of a vicious circle developing in which past participation in unemployment insurance creates the preconditions for future participation. In other words, the probability that an individual will be an unemployment insurance beneficiary at some point in the future will be greater if that individual happens to have a history of past participation than if he or she does not.[2]

There are several ways in which this process may occur. It may well be that "tastes" or opportunities evolve through time in a way that is dependent on past history. For example, the number of times the individual has collected UI benefits may influence the predisposition to collect them in the future. Collecting benefits may erase, at least partially, the stigma attached to receiving them. Further, the interaction with the program may lead the individual to become more informed about program parameters and the ease with which benefits may be collected. In either case, the greater the number of past occurrences of UI benefit receipt, the greater the probability and the duration of future receipt.[3]

The policy implication of the state-dependent interpretation is to change the nature of the program. With each successive unemployment insurance spell, the individual's preferences or the circumstances that he or she faces become more and more detrimental and cause more and more reliance on passive income support. In order to counter this tendency the payments should be made active in nature.[4]Another policy implication relates to the conduct of macroeconomic policy. If state dependence can be said to offer a microeconomic underpinning for hysteresis in unemployment rates, then the natural rate of unemployment as the basis for the conduct of macroeconomic policy is brought into question. The labour sector should not be confronted with severe policy shocks, as they may have long-term consequences by causing more individuals to experience a bout of insured unemployment and to possibly fall into a trap of repeat use. This may cause a permanent increase in the unemployment rate.

The analysis uses administrative data from July 1971 to March 1990. An econometric framework that is based on Heckman and Borjas [1980] and on Stern [1986] is developed to examine the determinants of repeat UI use, and to evaluate the neoclassical and the state-dependent interpretations.

Several conclusions are reached. Participation in the Canadian UI program is characterized by considerable repeat use. Over 80 per cent of the claimants in any given year are repeat users, with as many as 40 to 50 per cent experiencing their fifth claim or higher. The average claimant will experience a new claim once every three to four years. Repetition as soon as 14 weeks after the end of a previous claim, the type of repetition associated with the "10-40 syndrome," has a great deal to do with the seasonality of employment, while repetition over a longer horizon – five years after the end of a previous claim – is associated with the pattern of labour turnover in the industry. The young, particularly those under 20 years of age, have a much higher probability of being UI repeaters than older people. Indeed, the probability that first-time UI recipients who are young will have another UI spell within five years is in the neighbourhood of 80 to 90 per cent. In addition, there is an important and statistically significant relationship between the

number of past UI claims that an individual has had and the probability of experiencing another claim. The probability of experiencing a third claim is much higher than the probability of experiencing a second claim. This pattern is not easy to understand. It can be explained by either a neoclassical or a state-dependent model. We also find that there is a tendency for individuals to spend a longer and longer period of time on unemployment insurance with each successive claim. Rather than weaning themselves off the system, claimants become more and more dependent on it. We suggest that this is the result of an erosion of the stigma attached to the receipt of benefits by the experience of having received them. The term "stigma" should be broadly interpreted to mean a fixed cost associated with the psychological costs of receiving benefits, or with the cost of obtaining information about the operation of the program. This type of behaviour is particularly acute among the young. In combination with the finding that their incidence of repetition is very high, it points to a disturbing pattern that might be described as a vicious circle of UI dependency.

These results have implications for policy. If UI benefits are to be changed from passive to active payments, as recommended by among others the Commission of Inquiry on Unemployment Insurance [1986] and the Economic Council of Canada [1990], then this should be done according to the number of claims that the individual has made. For example, payments could be made to all first-time claimants in the usual manner, but they could become active for individuals that make a second claim within a given period from the end of their first claim. Organizing the program in this manner is independent of which interpretation – neoclassical or state-dependent – one brings to the high incidence of repeat use observed.

Description of the Data and a Preliminary Analysis

The data are drawn from the Status Vector records of the Longitudinal Labour Force Database file. These are the actual data used in the administration of the Canadian unemployment insurance system and are described in Employment and Immigration Canada [1990]. These records represent a 1-in-10 sample of all individuals that filed a UI claim at any point between July 1971 and about March 1990. Each record in the data represents a UI claim, and it is possible to organize the data by individual. A systematic 1-in-10 sample of individuals was drawn from this file so that, at least initially, the sample used in the following analysis is a 1-in-100 sample. Only claims in which an actual payment of benefits was made are considered. Thus, if an individual filed a claim and did not qualify for benefits, or perhaps found a job before any benefit payments were actually made, this claim is excluded from the analysis. Other exclusions, due for the most part to missing data,

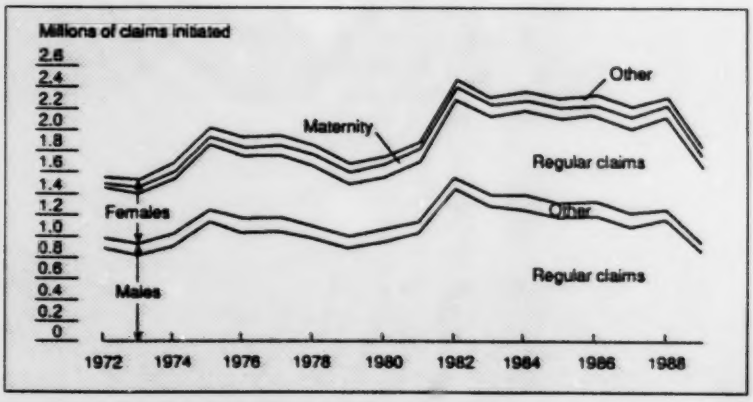
were made as the analysis progressed. The initial sample size is 363,531, representing 36,353,100 claims. These are organized by individual according to the date at which they began.

Figure 1 shows the number of claims represented by the sample according to the year in which they were initiated, the gender of the claimant, and the type of claim.[5] Overall, males are responsible for about two thirds of the total. A large proportion of claims initiated by males, about 90 per cent, are regular claims. The "other" category is made up mostly of sickness claims, about 4 per cent of the male total, and fishing claims, only about 2.3 per cent of the male total. Regular claims represent about 78 per cent of the total initiated by females, maternity claims represent 11.7 per cent, and sickness claims account for about 7 per cent. The aggregate numbers are the total number of claims started at any point during a given year. This is not directly comparable with the number of individuals unemployed at any given point in time, but the general pattern in the evolution of the numbers appears to be comparable with the movement in the number of unemployed over this period. The most notable feature is the sharp upward jump corresponding with the recession of 1982, and the persistence at high levels throughout the course of the subsequent recovery.[6]

All claims for each year are categorized according to their sequence number. The sequence number of a claim is the rank, from earliest to latest, of that claim in a given individual's history of UI claims. The distribution by sequence number of the total number of claims made in each year by all individuals is presented in Figure 2 for males, and in Figure 3 for females. Since the data

Figure 1

Number of UI claims by claim type and gender, Canada, 1972-88



begin in 1971, all claims during that year are categorized as first claims. By the late 1980s, however, a stable pattern appears in the distribution, especially in the case of males. For example, Figure 2 reveals that during 1989 only 17.7 per cent of the claims were initiated by first-time claimants. Fully 80 per cent of the claims were made by individuals who had been UI claimants at some point since 1971. In fact, almost 47 per cent of the male claimants in 1989 were beginning their fifth claim or higher. There is a clear increase in the proportion of first-time claimants associated with the 1982 recession, but with time participation in the UI system has settled into an equilibrium in which there is considerable repeat use. Once an individual makes an unemployment insurance claim, the chances that he will experience another claim at some point in the future seem to be very high.

The pattern is different for females (Figure 3). The extent of repeat use does not appear to be as great, but it is significant. During 1989 only 23 per cent of female claimants were first-time claimants. Further, the distribution does not appear to have settled into a steady state to the same extent as the male distribution. Probably the extent of repeat use will continue to increase for females, especially for those with five claims and higher.

Tables 1 and 2 present a summary of the extent of repeat use at the individual level, by gender. Individual cohorts of claimants are defined according to the year of first claim. Over the 1971-89 period, male UI recipients experience 3.33 claims and females experience 2.60, on average. These numbers, however, are influenced by the length of the sample period. Individuals who experienced their first claim in the late 1980s will have fewer spells, on average, because the time horizon of the data ends in early 1990. By examining individuals who experienced their first claim very early in the period, the longest possible time frame can be exploited. For example, males experiencing their first spell in the early 1970s will have an average of over four to possibly six spells during the next 15 to 18 years – one spell every three or four years or so. Fifteen to about 25 per cent of these cohorts will not experience another spell, but from 34 to almost 50 per cent will experience five or more spells. The corresponding figures for females experiencing their first claims in the early 1970s are about three to four spells, on average, over the remaining horizon, with 21 to 27 per cent not experiencing another spell but with 22 to 32 per cent experiencing five or more spells in total.

The average number of claims experienced over the sample period are presented by industry of first claim in Table 3, and by region of first claim in Table 4.[7] Individuals employed in agriculture, forestry, or fishing experience almost four claims, on average, with almost 32 per cent experiencing five or more claims. The numbers are lower in mining and even lower in manufacturing. Those employed in the service sector have the lowest average number of claims; in particular, those in nonmarket services experience slightly less than two claims, on average. Indeed, the majority of these individuals

Figure 2

Male UI claim sequence number by year, Canada, 1971-89

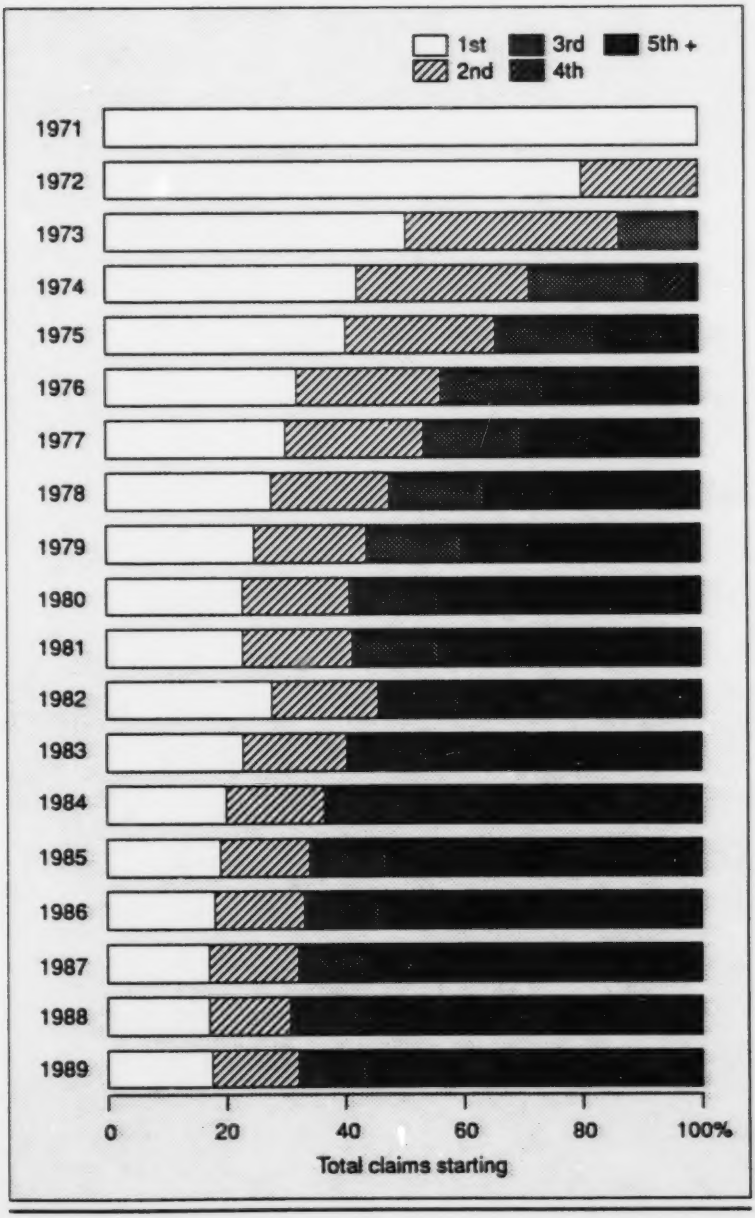


Figure 3

Female UI claim sequence number by year, Canada, 1971-89

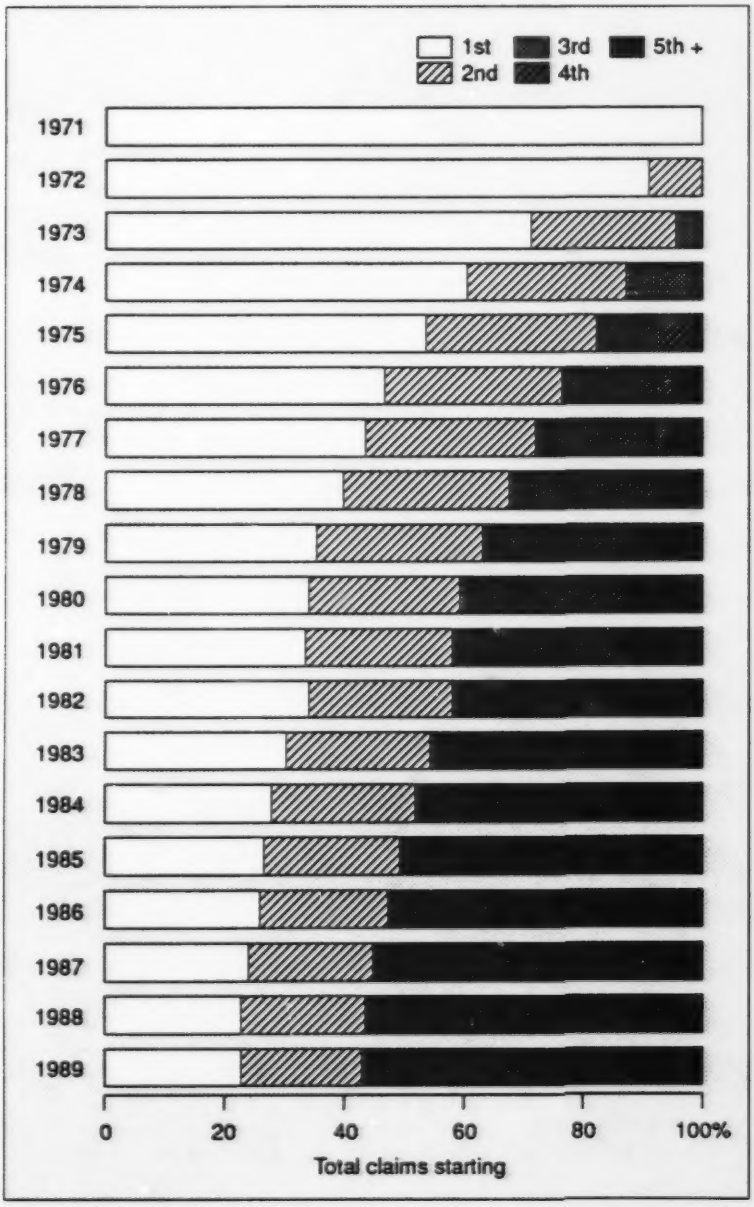


Table 1

Number of male UI claims by year of first claim, Canada, 1971-89

	Number of persons in sample	Average number of claims	Distribution of cohort by number of claims					
			1	2	3	4	5+	Total
			(Per cent)					
1971	3,992	5.98	15.4	12.7	12.5	9.59	49.8	100.0
1972	7,921	4.97	20.1	15.9	12.5	9.48	42.0	100.0
1973	4,661	4.22	26.1	17.1	12.5	9.78	34.6	100.0
1974	4,301	4.10	25.0	17.2	13.5	10.4	33.9	100.0
1975	5,036	3.69	26.7	19.8	13.2	10.7	29.7	100.0
1976	3,718	3.45	32.8	17.7	11.8	10.1	27.6	100.0
1977	3,539	3.37	31.5	18.6	13.7	10.6	25.6	100.0
1978	3,018	3.20	33.7	18.7	12.8	10.4	24.4	100.0
1979	2,437	3.07	33.2	18.5	14.3	11.8	22.1	100.0
1980	2,421	3.07	32.0	19.3	15.4	10.2	23.1	100.0
1981	2,646	2,76	34.9	20.0	16.9	10.9	17.4	100.0
1982	4,235	2.38	36.7	25.0	14.6	9.23	11.5	100.0
1983	3,153	2.28	43.8	22.2	14.8	8.56	10.7	100.0
1984	2,747	2.04	47.7	23.2	14.7	8.48	6.05	100.0
1985	2,461	1.90	49.5	25.5	14.4	7.64	2.96	100.0
1986	2,408	1.70	53.5	27.7	14.6	4.11	0.12	100.0
1987	2,081	1.52	57.6	33.7	8.31	0.43	0.00	100.0
1988	2,119	1.22	78.4	20.9	0.71	0.00	0.00	100.0
1989	1,690	1.01	99.3	0.71	0.00	0.00	0.00	100.0
Total	64,584	3.33	35.8	19.3	12.7	8.74	23.5	100.0

Table 2

Number of female UI claims by year of first claim, Canada, 1971-89

	Number of persons in sample	Average number of claims	Distribution of cohort by number of claims					
			1	2	3	4	5+	Total
			(Per cent)					
1971	1,780	4.06	21.5	18.7	15.5	12.5	31.9	100.0
1972	5,139	3.59	24.2	21.7	16.8	11.4	26.0	100.0
1973	4,355	3.23	27.5	22.3	16.9	11.3	22.0	100.0
1974	4,075	3.26	27.2	22.4	17.1	11.4	21.9	100.0
1975	4,075	3.09	29.3	22.6	17.2	11.0	19.9	100.0
1976	3,556	2.97	31.1	23.4	16.5	10.6	18.4	100.0
1977	3,340	2.90	30.9	23.5	17.5	10.9	17.3	100.0
1978	2,977	2.72	32.4	24.7	18.2	10.5	14.2	100.0
1979	2,439	2.63	34.7	25.3	16.5	9.59	13.9	100.0
1980	2,330	2.58	35.2	25.3	16.0	10.1	13.4	100.0
1981	2,508	2.52	34.1	26.5	17.5	10.3	11.5	100.0
1982	3,127	2.32	34.9	30.4	18.5	8.28	7.93	100.0
1983	2,761	2.20	37.6	30.7	17.9	7.32	6.58	100.0
1984	2,742	2.02	41.8	32.4	15.1	5.87	4.89	100.0
1985	2,622	1.77	50.2	31.4	12.4	4.08	1.98	100.0
1986	2,525	1.60	55.7	31.3	10.1	2.81	0.12	100.0
1987	2,385	1.38	67.9	26.5	5.41	0.13	0.04	100.0
1988	2,358	1.17	83.2	16.7	0.13	0.00	0.00	100.0
1989	2,046	1.01	99.3	0.73	0.00	0.00	0.00	100.0
Total	57,140	2.60	39.1	24.2	12.7	8.74	15.3	100.0

experience only one claim, while only about 7 per cent experience five or more. On a regional basis, individuals experiencing their first spells in Newfoundland have the greatest predisposition to be repeaters. On average, they experience 5.2 spells over the course of the sample period. Approximately 22 per cent experience only one spell, but over 40 per cent experience five or more. No other region records such extremes. Individuals whose first spells occur in Alberta experience the lowest number of spells – on average, 2.3 – with 43 per cent of them not repeating over the course of the sample period and only 10.4 per cent repeating five or more times.

Traps and Vicious Circles

How should this large degree of repetition in the use of the UI system be interpreted? In the first place, a caveat that has to do with issues of definition and sampling is in order. All of the above tabulations use the broadest possible definition of a repeat UI user; that is, someone who experiences at least two claims over the sample period. This does not treat the individuals in the sample symmetrically. An individual who experiences his or her first claim in 1972 will have 17 years to experience another and thereby fall into the category of "repeater," while an individual whose first spell occurs in 1988 will have only one year to gain such a distinction. This sampling problem requires us to restrict part of the following analysis to an examination of behaviour within a fixed period of time after the completion of any given spell.

With this caveat in mind, our modelling of repeat UI use relies primarily on the framework outlined by Flinn and Heckman [1982], Heckman [1991], and most notably Heckman and Borjas [1980]. In this literature, "state dependence" is defined as a situation in which history in some structural way influences current labour market outcomes. This is in contrast with a neoclassical model in which labour market outcomes depend only on individual attributes.

Heckman and Borjas [1980] offer a particularly clear exposition of these models. They define three different types of state dependence: 1) duration dependence, in which the probability of leaving a labour force state depends on the elapsed time spent in that state; 2) lagged-duration dependence, in which the probability of leaving a state depends on the length of previous spells in that or any other state; and 3) occurrence dependence, in which the probability of leaving a state depends on the number of past spells in that or any other labour force state. They argue that it is not a simple task to distinguish state dependence from a model based on heterogeneity of individual characteristics, because important elements of the latter may be unobservable. They outline the conditions under which each of the three types of state dependence are identifiable and conclude that occurrence dependence requires the least restrictive assumptions.[8]

Table 3

Number of UI claims by industry of first claim, Canada, 1971-90

	Number of persons in sample	Average number of claims	Distribution by number of claims					
			1	2	3	4	5+	Total
			(Per cent)					
Agriculture, forestry, and fishing	36,297	3.93	28.5	17.5	12.8	9.63	31.7	100.0
Mining	27,431	3.23	30.8	21.7	15.3	10.3	22.0	100.0
Manufacturing	12,196	2.35	43.4	23.3	14.2	7.84	11.2	100.0
Construction	3,647	2.49	32.5	22.8	15.2	10.2	19.4	100.0
Distributive services[1]	13,732	2.18	45.9	24.5	14.0	7.26	8.30	100.0
Nonmarket services[2]	12,474	1.97	54.7	22.4	10.8	5.18	6.96	100.0
Other services[3]	14,846	2.14	45.6	25.9	13.5	6.98	8.05	100.0
Total	120,623	2.90	37.4	21.5	13.6	8.57	18.9	100.0

1 Distributive services include transportation; storage; communications; electric power, gas, and water utilities; wholesale trade; and retail trade.
2 Nonmarket services include education and related services; health and welfare services; religious organizations; and public administration.
3 Other services include finance, insurance, and real estate; amusement and recreation; services to business management; personal services; accommodation and food services; and miscellaneous services.

Table 4

Number of UI claims by region of first claim, Canada, 1971-90

	Number of persons in sample	Average number of claims	Distribution by number of claims					
			1	2	3	4	5+	Total
			(Per cent)					
Newfoundland	3,183	5.23	21.8	15.5	12.6	9.39	40.7	100.0
Maritimes[1]	8,877	3.95	29.8	18.4	12.9	8.94	29.9	100.0
Quebec	34,143	2.94	33.3	20.8	13.6	9.03	23.3	100.0
Ontario	42,497	2.57	41.5	22.4	13.5	8.29	14.3	100.0
Manitoba-Saskatchewan	8,703	2.58	41.7	22.5	13.6	7.70	14.5	100.0
Alberta	9,385	2.33	43.0	24.7	14.3	7.49	10.4	100.0
British Columbia	14,831	2.87	37.6	21.5	14.1	8.97	17.9	100.0
Total	121,619	2.98	37.5	21.6	13.6	8.55	18.8	100.0

1 Excluding Newfoundland.

Occurrence dependence is the focus of our analysis. Heckman and Borjas' framework can be applied to our concerns in two related ways. The first argues that each occurrence of a UI claim increases the *probability* of another occurrence. If this is so, the time between claims should become shorter and shorter with each successive claim. The second argues that each occurrence of a UI claim increases the *length* of a future occurrence. If this is so, the duration of claims should become longer and longer with each successive claim. In these ways, repeat UI use feeds on itself and becomes more and more serious. This framework is to be distinguished from the neoclassical model, which also predicts that considerable repeat use will be associated with participation in the UI system, but that successive spells will, all other things being constant, be of equal length, on average.

Identifying occurrence dependence requires observations on multiple spells within a particular labour force state. A test for its presence can be based on an examination of the duration of successive UI spells, as well as on the lengths of time between successive spells. While the data that we employ covers a very long horizon, its major drawback has to do with the fact that it does not contain complete information on how the time between UI claims is spent. The beginning and end of all UI claims experienced over the sample period can be accurately dated. Therefore it is possible to examine whether each occurrence of a claim increases the length of future claims. However, the data offers only a limited amount of information on the time spent before the beginning of the first claim or after the end of the last claim.[9] There is no information on when individuals entered the labour force and hence how long they searched for employment or were employed before beginning their first claim. Similarly, there is no information on the activities of individuals after the end of the last recorded UI claim. Thus, to obtain an accurate dating of at least two periods of time between UI claims would require that the individual experience at least three claims over the sample period. Imposing such a requirement would likely introduce a sample selection bias into an analysis of whether each claim increases the likelihood of having another claim.[10]

One way of proceeding would be to base an analysis of occurrence dependence on such a sample, and to correct for the selection bias as Heckman [1979] did, by also modelling the probability that an individual has at least three UI claims. We do not pursue this avenue, but rather adopt the method of Stern [1986] and model the probability that any given claim will be followed by another.

Logit Analysis of Repeat Use

Stern [1986] examines the incidence of repeat unemployment from a quasi-longitudinal sample of U.K. males who started a spell of unemployment during

the autumn of 1978. In particular, he is interested in estimating the extent to which the potential amount of UI benefits influences the probability of having another unemployment spell. The probability of being a repeater within 6 months and within 12 months from the end of the initial unemployment spell is modelled as having a logistic distribution. In effect, Stern is estimating two points on the survivor function that characterizes the transition from employment (or non-participation) to unemployment for a given cohort of individuals.

His model proves not to have a great deal of predictive power. He finds that the amount of UI benefits has little influence on the likelihood of becoming a repeater. However, the most robust and most powerful finding concerns the influence of past unemployment on the probability of having another unemployment spell. Individuals that were recorded as having had an unemployment spell before the autumn 1978 spell experienced a probability of having yet another spell that was 10 to 12 per cent higher than those that did not. The length of the 1978 spell was also found to have a statistically significant and strong influence on the probability of being a repeater. Stern notes that the interpretation of these results are not unambiguous. They could represent the influence of unobserved individual heterogeneity, or they could represent state dependence. He ends his study with a call for more research into the role played by past unemployment in determining the likelihood of future unemployment.

We adopt a similar methodology, with the intention of highlighting the individual characteristics most associated with repeat UI use and examining the degree to which an individual's past labour force history influences the probability of having another UI spell. Three different categories of repeaters are defined in order to ensure that the chances of being a repeater are not influenced by the time horizon of the sample, and in order to focus on different patterns of behaviour. Some individuals may be subject to the so-called "10-40 syndrome," due perhaps to a seasonal pattern of employment. They may therefore be inclined to repeat very soon after the end of a spell. Other individuals may be employed in a cyclically sensitive industry and will be subject to repeat use over the course of the business cycle. We focus, therefore, on the following categories of repeat use: 1) short-term repeaters – those experiencing a second spell within 14 or fewer weeks of the end of their previous spell; 2) annual repeaters – those repeating within 52 weeks or less; and 3) longer-term repeaters – those who repeat within five years of a previous claim. This, in effect, defines three points on the survivor function governing the transition from a nonclaimant status to the beginning of a claim.

Following Stern [1986], the probability of being a repeat UI user is modelled as having a logistic distribution. Since the estimation of logit models requires the use of maximum-likelihood methods, the sample size is reduced

further by selecting all the claims for every tenth individual. Maintaining the initial 1-in-100 sample would not be feasible. Further, only fishing and regular claims are included in the analysis: maternity, sickness, and all other types of claims are excluded.[11]

Three separate definitions of repeat use are defined according to the above discussion. In the case of repetition within 14 or fewer weeks, the sample is defined to end at the last week of 1989. Each record in the analysis is a successful unemployment insurance claim and is assigned a value of 1 or 0 according to whether or not there is another claim for the same individual within 14 or fewer weeks from the last week in which benefits were received. The truncation of the sample endpoint ensures that all records are treated symmetrically. For example, if claims that began in January, February, or March of 1990 were included, they could not possibly have the same chance of being designated as repeaters because the sample does not contain any information beyond March 1990. A similar classification is performed for repetition within 52 or fewer weeks and 260 or fewer weeks, and the sample endpoint is likewise reduced by one and five years.

The regressors used reflect the information available in the original data file and the hypotheses of concern. They are defined in Appendix Table A-1, while the summary statistics are presented in Tables A-2 and A-3. The sample sizes for males are 14 weeks – 18,114; one year – 17,256; and five years – 12,875. The sample sizes for females are 11,027, 10,359, and 7,239, respectively. The reference category for the logit models is a claimant who was employed in the Ontario manufacturing sector, with characteristics defined by all the indicator variables taking on a value of zero, and whose claim began during the first quarter of the year.[12] The results are presented in Table A-4 for the male subsample, and in Table A-5 for the female subsample.[13]

The influence of the variables in the model and the differences between males and females are more easily interpreted if the predicted probabilities and the marginal impacts of the variables are examined. These are presented in Tables 5 and 6. Only regressors that are significant at the 90-per-cent level of confidence or better are considered to have a non-negligible influence on the probability of repetition. The calculations in these tables are also based on the standard case of an Ontario claimant employed in manufacturing whose claim began during the first quarter of the year, who is experiencing his or her first claim, and with other characteristics given by the indicator variables taking on the value of zero.[14]

For the most part, claims by males have a higher probability of leading to UI repetition than claims by females. The only clear exception to this is the case of repetition within five years. There is a 21-per-cent chance that a male will file another UI claim within 14 or fewer weeks of the end of his first claim, but only a 13-per-cent chance that a female will do so. The probability

Table 5

Probability of repeat male UI use

	14 weeks	1 year	5 years
Probability of repeating[1]	21.0	40.9	60.8
Change in probability[2]			
Age[3]	1.32	4.76	2.95
Dependents	–1.34	0.00	4.52
Student	0.00	0.00	0.00
U Rate[4]	0.95	1.49	0.00
CMA	0.00	–4.41	–2.97
Nfld	5.87	19.7	24.2
Maritimes	5.91	14.4	14.3
Quebec	4.33	6.82	8.56
Man-Sask	0.00	0.00	0.00
Alberta	0.00	0.00	0.00
BC	5.83	0.00	0.00
Ag-For-Fsh	0.00	4.68	9.22
Mining	0.00	0.00	3.88
Construction	2.43	3.32	6.31
Distrib Services	–4.57	–3.08	0.00
Non-Mrkt Services	–2.36	0.00	–7.09
Other Services	0.00	–3.34	–5.60
2nd quarter	–4.54	–5.44	–3.80
3rd quarter	–5.85	–4.73	0.00
4th quarter	–8.03	0.00	0.00
FourWeek	–6.75	5.65	–5.55
Benefit Rate[3]	0.00	0.50	0.00
Benefit-OverMax	0.37	–0.21	0.00
Past Training	–3.34	–6.89	0.00
Benefit Weeks[3]	0.92	–2.24	–1.77
Spell Count[4]	4.21	7.24	8.40
Employed > 52	0.00	–9.62	–9.38

1 For an individual with standard characteristics defined as: age, 33 years; unemployment rate, 10 per cent; benefit rate, $167; Ben-OverMax, $140; benefit weeks, 22; spell count, 1; and all indicator variables set to zero.
2 See Table A-1 for a definition of the mnemonics.
3 Change in probability for a 10-unit change in the independent variable.
4 Change in probability for a 1-unit change in the independent variable.

of repetition within one year is about 40 per cent for both genders. The probability of repetition within five years is very high regardless of gender, but it reaches almost 70 per cent for females while it is 61 per cent for males.

Table 6

Probability of repeat female UI use

	14 weeks	1 year	5 years
Probability of repeating[1]	13.1	39.9	68.9
Change in probability[2]			
Age[3]	0.00	3.42	–1.41
Dependents	–2.93	–3.23	0.00
Student	0.00	5.47	0.00
U Rate[4]	1.74	2.59	0.99
CMA	0.00	–4.61	0.00
Nfld	0.00	11.5	8.28
Maritimes	6.17	12.6	8.51
Quebec	5.69	5.00	4.24
Man-Sask	0.00	0.00	0.00
Alberta	0.00	–11.1	0.00
BC	0.00	–4.73	0.00
Ag-For-Fsh	–3.38	0.00	0.00
Mining	–5.56	0.00	–5.13
Construction	–5.84	0.00	0.00
Distrib Services	–7.80	–10.6	–8.21
Non-Mrkt Services	–4.56	0.00	0.00
Other Services	–6.47	–8.02	–6.36
2nd quarter	–2.00	3.47	0.00
3rd quarter	0.00	0.00	0.00
4th quarter	0.00	4.19	0.00
FourWeek	0.00	3.35	0.00
Benefit Rate[3]	0.00	0.00	0.00
Benefit-OverMax	0.00	–0.27	0.00
Past Training	0.00	0.00	0.00
Benefit Weeks[3]	–0.04	–4.00	–3.39
Spell Count[4]	2.50	5.97	6.04
Employed > 52	–4.55	–12.8	–5.55

1 For an individual with standard characteristics defined as: age, 33 years; unemployment rate, 10 per cent; benefit rate, $167; Ben-OverMax, $140; benefit weeks, 22; spell count, 1; and all indicator variables set to zero.
2 See Table A-1 for a definition of the mnemonics.
3 Change in probability for a 10-unit change in the independent variable.
4 Change in probability for a 1-unit change in the independent variable.

The male pattern of repetition is dominated by seasonal factors in the short term. The probability of repetition within 14 weeks falls by 4.5 and almost 6 per cent if claims that begin in the second and third quarters are consid-

ered, and by over 8 per cent if a claim that begins in the fourth quarter is considered. Fourth-quarter claims initiated by males have about the same probability of repetition as female claims that begin in any quarter. The seasonal influence diminishes gradually as a longer and longer horizon is examined.

Industry effects become more and more important. Over the shortest horizon only construction, distributive services, and nonmarket services have probabilities of repetition significantly different from that of manufacturing, but over the longest horizon a clear pattern exists; only distributive services are indistinguishable from manufacturing. Employment in agriculture, forestry, and fishing increases the probability of being a repeater within five years by over 9 per cent, employment in nonmarket services lowers it by over 7 per cent. There are important, but different, industry effects for females. In the short term, the probability of repetition is highest for females employed in manufacturing. Over time, the influence of industry diminishes so that for the model of repetition within five years, only three of the six industries have a significantly different probability than manufacturing.

The influence of region of residence is broadly similar in the genders. The results for males indicate that, regardless of the time horizon adopted, the important distinction is between those provinces east of the Ottawa River and all the others. Only in the case of British Columbia over the shortest of horizons is a western region significantly different from Ontario. The probability of repetition within 14 weeks is about 5.9 per cent higher in Newfoundland and the Maritimes than it is in Ontario, and 4.3 per cent higher in Quebec. If the 10-40 syndrome exists, the chance of it existing in the east is greater, but not much greater, than in the west. For longer horizons, the probability of repetition is much higher in the eastern region and much higher in Newfoundland than anywhere else. An Ontario male has a 61-per-cent chance of being a repeat UI user within five years, and the chances of a Newfoundland male with similar characteristics are 75 per cent. The provincial pattern for the case of females is broadly similar, with the exception that Newfoundland residents have no greater chance than Ontario residents of repeating in the very short term, and that Albertans and British Columbians have much lower probabilities over the one-year horizon. These considerations aside, the east-west dichotomy is clearly evident. The probability of repetition in Newfoundland is not different from that in the rest of the Atlantic provinces over a 14-week horizon, but it is significantly greater over longer horizons.

Since the influence of age on the probability of repetition is nonlinear, it is more accurately illustrated graphically. Figures 4 and 5 depict the relationship between the probability of being a repeater for each of the four definitions and age, by gender. For the most part the probability falls, then rises very slightly, then falls again. This cubic relationship is stronger for males than females, and stronger the longer the time horizon. The probability of

Figure 4

Probability of repeat male UI use by age at time of first claim, Canada

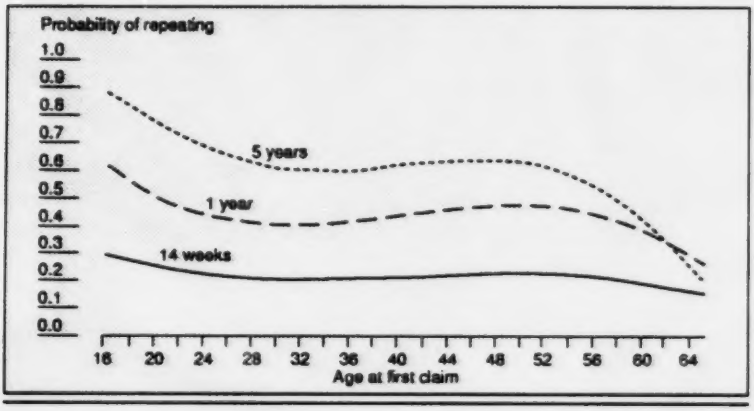
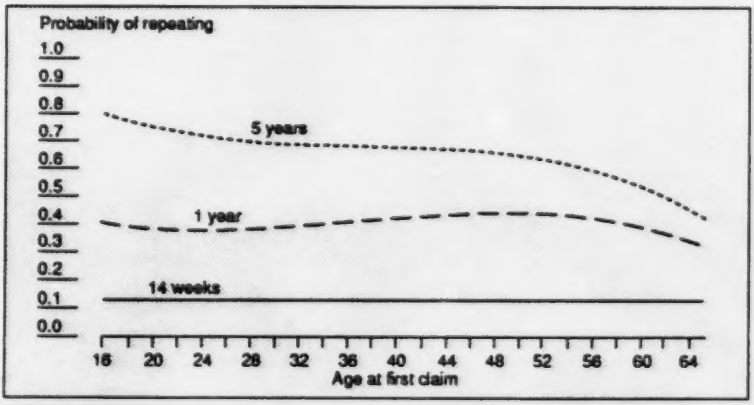


Figure 5

Probability of repeat female UI use by age at time of first claim, Canada



repetition is particularly high for the young. The model suggests that when a 16-year-old male experiences his first claim there is almost a 90-per-cent chance that he will experience another within five years. This probability falls off rapidly, reaching a local minimum at about 60 per cent for a 33-year-old. It is also very high for young females, about 80 per cent, but it falls off only

gradually and in almost a linear fashion with age. There does not appear to be a very strong relationship between age and repeat use when the 14-week horizon is considered. Males under the age of 20 or so have a higher probability of repeating within 14 weeks than their older counterparts, but after about 25 years of age there is no further decline until the age of 60 or so. There is no statistically significant relationship between age and the probability of repeating within 14 weeks for females.

The influence of past training on the probability of repetition is limited to males over the shorter horizons. Table 5 reveals that having had training in the past reduces the probability of repetition within 14 weeks by 3.3 per cent and within one year by 6.9 per cent. This should not be taken as a definitive assessment of the impact of training, in large part because no attention is paid to the process by which individuals are chosen for the program. At most it suggests that a certain caution is needed in making policy recommendations to increase the training envelope of the UI program, and at least it suggests that further study is required.[15]

The variables representing the individual's past labour-force history are collectively very important influences on the probability of repetition. In particular, the influence of the number of occurrences of past claims on the probability of repetition is nonlinear in nature. This is clear from Appendix Tables A-4 and A-5. The probability of repetition within 14 weeks is more than 4 percentage points higher for a male experiencing his second claim than it is for an otherwise identical male experiencing his first claim. It is 8.4 percentage points higher for repetition within five years. The comparable figures for females are 2.5 and 6 percentage points.

The duration of past employment also has a rather large influence on the probability of repetition. It has no influence over a 14-week horizon for males, but it does have a strong influence over the remaining horizons, lowering the probability of repetition by about 9.5 percentage points. For females the influence of this factor is present over all horizons. Women with employment periods that lasted longer than one year are 4.6 per cent less likely to be repeaters over the next 14 weeks, and almost 13 per cent less likely over the next year, than women who had employment that lasted one year or less.

It could be argued that these results cannot distinguish between a neoclassical model of repeat use and a model predicated on occurrence dependence because there is no control for unobserved individual heterogeneity. In particular, it is not clear whether the influence of the number of past UI claims on the probability of having another claim represents a structural relationship – that is, a UI "trap" – or a spurious one reflecting the influence of unobserved variables. Nevertheless, the results do document the extent and pattern of repeat use and the individual characteristics associated with it. Over the short term seasonal patterns dominate, while over the longer term industry-

specific patterns are clear. Also notable is the very high probability of repeat use among the young, particularly young males.

Regression Analysis of Occurrence Dependence

In this section the following question is addressed: Does past participation in the unemployment insurance system influence the duration of future UI spells? This question concerns a particular form of state dependence in labour-market behaviour that has been called "occurrence dependence" by Heckman and Borjas [1980].

Attempts in the literature to examine occurrence dependence have been restricted to the dynamics of unemployment. There have been no analyses of occurrence dependence in the use of unemployment insurance. Ellwood [1982, 350] is concerned with the longer-term consequences of unemployment that occurs early in the careers of a sample of U.S. male teenagers. He finds that his data "provide no evidence that early unemployment sets off a vicious cycle of recurrent unemployment." Ruhm [1991] reaches a similar conclusion in a study of the long-term consequences of job displacement. These studies use similar methodologies, which has been criticized by Willis [1982].

Heckman and Borjas [1980, 272-79] offer results of an examination of occurrence dependence in the employment and unemployment dynamics of a sample of U.S. high-school graduates. They also reach the conclusion that there is no evidence of its existence, but their sample is rather small, ranging from 33 to 50 observations, and covers a panel of only 30 months [1980, 279]. The test that they use is based on the argument that if occurrence dependence is present, the distribution of unemployment spells should vary according to the sequence number of the spell. Tests may be formulated around various moments of this distribution. A test of "mean occurrence dependence" is a test of whether the mean durations of spells vary with the sequence number of the spell.

The possibility that successive UI spells become longer and longer is present in our data set, which is much larger and covers a considerably longer panel than those used elsewhere. Table 7 presents the average spell durations for two alternative definitions of a UI spell, by sequence number and gender. The two definitions are the number of weeks of benefits collected during the claim and the actual length of the claim. These may differ because individuals may work while on claim, collect no benefits, and then return to collect any remaining benefits. This pattern of behaviour may be more prevalent after the removal of the four-week rule in 1977 than before. Both definitions are used in order to assess the robustness of the results. It is not apparent which definition is best suited for the present purposes. Indeed, other definitions of UI spell duration are possible.[16]

Also presented are the averages for a sample of "young" males and females, defined to consist only of claims for individuals who were less than 17 years of age in 1971. This sample is used in order to ensure that the complete history of the individual's interaction with the UI system is captured. The sequence numbers count only the number of occurrences of UI claims since 1971, when a major reform of the system came into effect. They sequence, therefore, the number of claims made under the UI system as defined by the 1971 act and all of the subsequent amendments to it, not the total number of claims ever made under the Canadian UI program. Defining a subsample of the young, who could not have been labour force participants before the new program came into being, ensures that the entire UI history of an individual is included in the analysis.[17] Further, since the hypothesis of concern involves the possibility that habits or information evolve through an interaction with the UI system, it may be particularly important to focus the study on the groups that are just beginning to participate in the labour market. Habit formation and information gathering will be particularly important for these groups.

For both genders and definitions of spell duration, the average duration increases with sequence number. First-time male UI claimants receive, on average, 19.8 weeks of benefits and their claims last about 28.2 weeks. Their female counterparts experience durations of 21.3 and 28.2 weeks. These figures are about four and seven weeks longer for males experiencing their fifth claim, and about four and eight weeks longer for females. Young males have spells that tend to be longer than the entire sample of males, but the pattern of longer spells with higher sequence numbers is just as evident. First-time young male claimants collect 22.9 weeks of benefits, on average, and experience claims of an average length of 32.4 weeks. These figures are 25.2 and 37.4 weeks for the fifth claim. The average spell duration of young females, however, is not too different from the overall female sample. Benefit weeks paid increase from 22.4 weeks for first claims to 27 weeks for fifth claims, while claim durations increase from 30.5 weeks to 37.5 weeks.[18]

We consider Heckman and Borjas' test for occurrence dependence for a sample collected from a nonstationary environment, which, given the fluctuations of the business cycle and changes in UI legislation over the 19 years that our data cover, is the most relevant. In a nonstationary environment, all of the observed and unobserved determinants of spell duration must be controlled for. Let t index the duration of a spell and n index be the sequence number. Let $t^n = \exp(X^n\beta^n + R^n)$, where X^n is a row vector representing the observable individual characteristics determining spell duration, and R^n represents the unobservable determinants. The exponentiation is needed since spell durations cannot be less than zero in length. A log-linear formulation, $\ln t^n = X^n\beta^n + R^n$, is valid if the sample contains only completed spell durations and there are no time-varying covariates [Heckman and Borjas 1980, 270-72]. Occurrence dependence is said to exist if $\beta^n \neq \beta^{n+1}$; that is, if the same

Table 7

Average unemployment insurance spell durations by sequence number and spell-type

	Sample size	Benefits paid	Claim duration
		(Weeks)	
Spell sequence number			
Male subsample			
1	36,891	19.8	28.2
2	28,093	20.6	29.9
3	20,206	21.7	32.7
4	14,748	22.8	34.0
5	10,924	23.4	35.4
All spells	142,912	21.8	32.2
Young male subsample			
1	14,993	22.9	32.4
2	10,128	23.7	33.8
3	6,867	24.2	35.2
4	4,630	25.0	36.6
5	3,205	25.2	37.4
All spells	46,290	24.0	34.6
Female subsample			
1	32,368	21.3	28.2
2	20,328	22.8	30.6
3	12,189	23.9	32.9
4	7,540	24.8	34.9
5	4,763	25.2	36.0
All spells	87,106	23.0	31.5
Young female subsample			
1	12,001	22.4	30.5
2	6,905	24.1	32.8
3	3,732	25.3	35.0
4	2,104	26.5	36.6
5	1,188	27.0	37.5
All spells	27,586	24.0	32.9

characteristics have different impacts on the duration of spells according to sequence number. The determinants of the conditional mean of spell durations have changed because of the past occurrence of the state.

The conditional mean may well change if $X^n \neq X^{n+1}$, but as long as these changes are exogenous to the process; that is, not a result of the occurrence of past spells, then no special problem is posed. However, $R^n \neq R^{n+1}$ may

also be the cause of changes in the mean spell duration in a way that is equivalent to changes in β. Heckman and Borjas formulate a test of mean occurrence dependence on the basis of first differences in successive spell durations:

$$\ln t^{n+1} - \ln t^n = X^{n+1}\beta^{n+1} - X^n\beta^n + R^{n+1} - R^n. \quad (1)$$

Adding and subtracting $X^n\beta^{n+1}$ to the left-hand side of equation 1 yields:

$$\ln t^{n+1} - \ln t^n = \beta^{n+1}\Delta X + (\beta^{n+1} - \beta^n)X^n + R^{n+1} - R^n. \quad (2)$$

A test of the null hypothesis of no mean occurrence dependence may be formulated as a test of the null that the coefficients on the X^n are collectively equal to zero. If $R^n = b^n\phi + \mu^n$, and $R^{n+1} = b^{n+1}\phi + \mu^{n+1}$, then $R^{n+1} - R^n = (b^{n+1} - b^n)\phi + \mu^{n+1} - \mu^n$, where the μ^j are white noise. In other words, if the unobserved components can be modelled as person-specific fixed effects, and if $b^{n+1} = b^n$, then the residual of equation 2 is just white noise. This is a maintained assumption; it implies that the pattern of UI duration does not change over individuals over time.

Equation 2 is estimated using a 1-in-100 version of the sample defined in the section entitled "Logit Analysis of Repeat Use." Definitions and descriptions of the regressors used in the formal test for occurrence dependence are provided in Appendix B. A total of 28 regressors, including an intercept, make up the set of unchanging variables, X. The choice of this set is motivated by the work of Corak [1991]. The results of the regressions for both definitions of the dependent variable, the change in the number of weeks of benefits received, and the change in the duration of the claim for both genders are also presented in Appendix B.

Table 8 presents the F-statistics for tests of the null that all of the regressors in X are jointly equal to zero; that is, for the null of no occurrence dependence. Two regressions were undertaken for each of the four samples highlighted in Table 7. The first regression pools, over individuals, all of the successive differences in adjacent UI spells, while the second uses only the difference in spell lengths between the first and second spells. The major reason for singling out the latter sample has to do with the possibility that much of the information gathering or habit formation may occur early on, during the first or second interaction with the UI program, rather than evolving continually with each spell. In other words, the coefficients of the model may change discretely after the first encounter with the program but remain stable thereafter. Thus our preferred sample for a test of occurrence dependence is the differences between first and second spells for the young, since it is only in the samples of the young that we are assured of capturing the very first UI spell. The F-statistics reported in Table 8 suggest that the null hypothesis of no occurrence dependence is strongly rejected for all samples for both genders.

Table 8

***F*-statistics for regression-based tests of mean occurrence dependence**

	Benefits paid	Claim duration
	(Weeks)	
Males		
All spells	50.1 (0.0001)[1]	67.9 (0.0001)
First-second spells	7.5 (0.0001)	12.0 (0.0001)
Young males		
All spells	34.5 (0.0001)	49.8 (0.0001)
First-second spells	6.4 (0.0001)	8.4 (0.0001)
Females		
All spells	39.9 (0.0001)	48.7 (0.0001)
First-second spells	12.9 (0.0001)	12.9 (0.0001)
Young females		
All spells	16.3 (0.0001)	20.3 (0.0001)
First-second spells	4.3 (0.0001)	4.1 (0.0001)

1 Numbers in parentheses indicate marginal significance level of an *F*-test with 28 degrees of freedom in the numerator of the statistic; degrees of freedom in the denominator vary with each sample.

In order to offer some control for seasonal and industry-specific patterns of repeat use, which were noted in the previous section, the regressions were repeated by industry. The resulting *F*-statistics for the null of no occurrence dependence are presented in Table 9 for the regressions using the difference in benefit weeks paid as a regressand, and in Table 10 for those using the claim duration. The null is rejected strongly in the majority of cases but cannot be rejected in some of them at a reasonable level of significance. In particular, it cannot be rejected in our preferred sample of the difference in first and second spells of young males and females for some of the service industries. This is the case for nonmarket services and, also, in the case of females, for construction.

Table 11 reports the relative length of successive spells; that is, the ratio of t^{n+1} to t^n. These results are derived by exponentiating the predicted values of the dependent variable from the regressions that form the basis of Table 8 and Appendix B. The results are derived by setting the values of all of the changing variables, those in the vector ΔX, to zero. This is a *ceteris paribus* result. It represents the change in the ratio of successive spell lengths due

Table 9

***F*-statistics for regression-based tests of mean occurrence dependence by industry: benefit weeks paid**

	All spells	First-second spells
	(Weeks)	
Males		
Agriculture, forestry, and fishing	29.9 (0.0001)	5.73 (0.0001)
Mining	6.0 (0.0001)	2.86 (0.0001)
Construction	17.6 (0.0001)	3.04 (0.0001)
Nonmarket services	5.0 (0.0001)	1.26 (0.1899)
Other services	5.8 (0.0001)	1.54 (0.0560)
Distributive services	6.0 (0.0001)	1.61 (0.0384)
Manufacturing	10.5 (0.0001)	1.90 (0.0080)
Young males		
Agriculture, forestry, and fishing	21.2 (0.0001)	2.96 (0.0001)
Mining	1.5 (0.0584)	1.88 (0.0094)
Construction	14.8 (0.0001)	3.51 (0.0001)
Nonmarket services	3.0 (0.0001)	1.90 (0.0087)
Other services	5.3 (0.0001)	1.50 (0.0673)
Distributive services	5.2 (0.0001)	0.92 (0.5718)
Manufacturing	6.9 (0.0001)	2.05 (0.0034)
Females		
Agriculture, forestry, and fishing	18.6 (0.0001)	4.52 (0.0001)
Mining	11.4 (0.0001)	6.66 (0.0001)
Construction	2.6 (0.0001)	1.90 (0.0131)
Nonmarket services	7.0 (0.0001)	2.47 (0.0002)
Other services	8.9 (0.0001)	2.21 (0.0012)
Distributive services	6.2 (0.0001)	2.74 (0.0001)
Manufacturing	9.4 (0.0001)	3.22 (0.0001)
Young females		
Agriculture, forestry, and fishing	8.3 (0.0001)	2.32 (0.0007)
Mining	2.1 (0.0001)	. . .
Construction	2.1 (0.0001)	1.43 (0.1200)
Nonmarket services	4.8 (0.0001)	1.16 (0.2795)
Other services	5.8 (0.0001)	1.76 (0.0178)
Distributive services	4.1 (0.0001)	1.52 (0.0604)
Manufacturing	4.3 (0.0001)	1.82 (0.0126)

solely to occurrence dependence; that is, to the change in the coefficients of the model.

The results for males suggest that successive UI spells are becoming longer and longer when only occurrence dependence is at play. The number of benefit

Table 10

***F*-statistics for regression-based tests of mean occurrence dependence by industry: claim duration**

	All spells	First-second spells
	(Weeks)	
Males		
Agriculture, forestry, and fishing	39.6 (0.0001)	7.91 (0.0001)
Mining	6.7 (0.0001)	2.95 (0.0001)
Construction	19.3 (0.0001)	1.71 (0.0236)
Nonmarket services	8.3 (0.0001)	1.67 (0.0298)
Other services	11.9 (0.0001)	2.25 (0.0010)
Distributive services	9.8 (0.0001)	2.11 (0.0023)
Manufacturing	13.8 (0.0001)	3.38 (0.0001)
Young males		
Agriculture, forestry, and fishing	30.2 (0.0001)	4.02 (0.0001)
Mining	1.5 (0.0639)	1.92 (0.0072)
Construction	15.6 (0.0001)	2.38 (0.0004)
Nonmarket services	4.3 (0.0001)	1.37 (0.1238)
Other services	8.7 (0.0001)	1.75 (0.0184)
Distributive services	7.0 (0.0001)	1.91 (0.0076)
Manufacturing	8.5 (0.0001)	2.35 (0.0005)
Females		
Agriculture, forestry, and fishing	25.2 (0.0001)	4.76 (0.0001)
Mining	13.4 (0.0001)	8.25 (0.0001)
Construction	2.8 (0.0001)	1.47 (0.0901)
Nonmarket services	14.2 (0.0001)	1.51 (0.0648)
Other services	10.4 (0.0001)	2.21 (0.0012)
Distributive services	6.1 (0.0001)	2.28 (0.0008)
Manufacturing	6.7 (0.0001)	2.30 (0.0007)
Young females		
Agriculture, forestry, and fishing	13.5 (0.0001)	3.42 (0.0001)
Mining	1.6 (0.0445)	. . .
Construction	2.3 (0.0008)	1.22 (0.2490)
Nonmarket services	7.2 (0.0001)	0.96 (0.5124)
Other services	5.5 (0.0001)	1.52 (0.0604)
Distributive services	4.7 (0.0001)	1.90 (0.0083)
Manufacturing	3.7 (0.0001)	1.42 (0.0976)

weeks paid increases by 12 per cent, while the duration of the claim is unchanged. In the preferred sample of first-second spells for young males, the number of benefit weeks collected is 16 per cent longer during second spells, but the claim duration of the second spell is as long as that of the first.[19]

Table 11

Relative length of successive unemployment insurance spell duration[1]

	Benefit weeks paid	Claim duration
	($\Delta X = 0$)	
Males		
All spells	1.12	1.01
First-second spells	1.11	1.00
Young males		
All spells	1.15	1.01
First-second spells	1.16	0.997
Females		
All spells	1.14	1.02
First-second spells	1.17	1.06
Young females		
All spells	1.25	1.11
First-second spells	2.35	1.04

1 The ratios of successive lengths of UI spells as calculated from the exponentiation of the predicted results of the least-squares regressions presented in Appendix B. Calculations are made at the point of sample means for the nonchanging regressors and with all indicator variables set to zero. $\Delta X = 0$ indicates the set of results when all of the changing regressors are set to zero.

In the case of females, the number of benefit weeks paid during second spells is 17 per cent longer than that paid during first spells, and claim duration increases slightly, by about 6 per cent. The most notable result in Table 11 is that young females collect benefits for a much longer time during their second spell; the ratio of the duration of benefit weeks collected during second spells to that of first spells is 2.35. This is a very large increase and suggests that, on average, this group is particularly prone to a change in labour-force behaviour as a result of interacting with the program.

In general, there appears to be substantial difference in the ways that claimants interact with the UI program over time. There is a tendency for successive UI spells to become longer and longer. For both genders, occurrence dependence is a force that, all other things being constant, will lengthen the spell. The general pattern of interaction with the program tends to be such that the number of benefit weeks paid increases substantially with each successive spell, but the duration of the claim remains unchanged. The implied increase in duration of benefit weeks collected by young females is particularly large.

This can be interpreted as implying that with each interaction with the program a claimant collects more benefits and spends a shorter time working while on claim.

Conclusion

Participation in the Canadian unemployment insurance system is characterized by considerable repetition. First-time UI claimants represented only 17.7 per cent of the claims initiated by males during 1989, the last full year for which data are available. More than 80 per cent of those individuals that began a UI claim in 1989 had experienced another claim at some point since mid-1971. Indeed, about 47 per cent were beginning their fifth claim or higher. The figures for female claimants are not quite as high but are still significant: 23 per cent were first-time claimants and about 30 per cent were experiencing their fifth claim or higher.

Repetition over a horizon as short as 14 weeks after the end of a previous claim, the type of repetition associated with the "10-40 syndrome," has a great deal to do with the seasonality of employment, while repetition over a longer horizon – five years after the end of a previous claim – is associated with regional and industrial patterns of labour turnover. That is to say, in both the very short term and the longer term an important determinant of repeat UI use is the fluctuation of labour demand in the firms and industries that individuals find themselves employed.

The probability of repeat use is particularly high among the young. Males who are under 20 years of age when they experience their first UI spell have an 80-to-90-per-cent chance of experiencing another spell within five years, while females of the same age have a 75-to-80-per-cent chance of repeating.

There is a large and statistically significant relationship between the number of past UI claims and the probability of experiencing another claim. For a representative male the probability of experiencing a second claim within 14 weeks of the first claim is 21 per cent, while the probability of experiencing a third after experiencing two claims is 25.2 per cent. Over a five-year horizon these figures are 60.8 per cent and 69.2 per cent. For females the probability of repetition within 14 weeks increases from 13.1 per cent to 15.6 per cent for the move from first to second and second to third claims, respectively. Over a five-year horizon the probabilities are 68.9 and 74.9 per cent. The interpretation of this relationship is not straightforward. It may reflect – in accordance with a neoclassical model – the influence of unobserved individual characteristics, or it may reflect – in accordance with a state-dependent model – a structural relationship between past UI experience and current status. If there is any weight to the latter possibility, the implications for the young

are particularly pertinent. A bout of unemployment insurance early in an individual's career may create the preconditions for another bout. Individuals may find themselves falling into a trap of repeat use.

There is strong support for occurrence dependence in the duration of UI spells. The structure of the model determining the duration of individual claims and benefit weeks paid is not stable across successive claims. Claimants tend, all other things being equal, to spend a longer and longer time collecting benefits with each claim they make. The number of benefit weeks collected by young males during their second claim is estimated to be 16 per cent longer than during their first claim. In the case of young females, the number of benefit weeks collected more than doubles during the second claim. Rather than weaning themselves off unemployment insurance, these groups appear to be getting more and more dependent on it. This is not due to the generosity of the program per se. The most likely interpretation has to do with the possibility that the stigma attached to the receipt of UI payments is eroded by the experience of having received them. The term "stigma" should be broadly interpreted to mean a fixed cost associated with the psychological costs of receiving unemployment insurance or with the costs of obtaining information about the operation of the system. Thus the results do not permit us to distinguish neoclassical and state-dependent interpretations of the incidence of UI use, but they do offer support for a state-dependent interpretation of the duration of use.

The current nature of the unemployment insurance system does little to reintegrate individuals into a stable pattern of employment. This is particularly so for the incidence of UI use among the young, as well as for the duration of use among all groups. Once in the unemployment insurance system, the chances are very high that individuals will experience a cycle of longer and longer spells. This possibility lends support to the view that program payments should be transformed from a scheme of insurance payments that provide passive income support to one of active payments that would promote the individual's re-entry into a stable pattern of employment.

This recommendation, however, raises certain issues for reform-minded policymakers. The first concerns the targeting of program funds. An "active" reform of the UI program would most likely involve the reorientation of a significant proportion of program funds, but it would still leave in place a program that offers both active and passive payments. In this context, an attempt has to be made to establish which claimants need or are most likely to benefit from active payments, so that these funds can be targeted towards them. One implication of the results is that active program payments should be targeted according to the number of claims that an individual has made: first-time claimants should receive passive income support, while second-time claimants should receive active support.

A structure of this sort does not depend on which interpretation of repeat use is correct. A neoclassical interpretation would suggest that a high degree of repeat use may be used as a signal of the unobserved individual characteristics that determine such behaviour. Targeting active payments on the basis of the number of claims made permits individuals to "self-select" into the training envelope of the UI budget. On the other hand, a state-dependent interpretation would suggest that individuals are *ex ante* identical and that they become distinguishable as being in need of training only through having experienced unemployment. In this sense, those individuals with a record of repeat use represent the target group. Being able to distinguish these views is probably more important for how training programs are designed and how effective they will ultimately be than for how they should be targeted.

The little evidence that has been provided in this paper suggests that participation in a training or apprenticeship program is effective in lowering the incidence of repeat use only in the shorter term, and only for males. Over horizons longer than a year it has no effect in reducing the incidence of repeat use. The design and effectiveness of "active" support needs to be examined in a much more rigorous manner before full support can be given to proposals for reform.

Appendix A

Table A-1

Definitions of variables used in logit analysis of repeat use

Mnemonic	Definition
Age/10	Age in years of the individual when the claim was initiated divided by 10
$(Age/10)^2$	Age/10 squared
$(Age/10)^3$	Age/10 cubed
Dependents	One if claimant had dependents, zero otherwise
Student	One if claimant was a student, zero otherwise
U Rate	Regional unemployment rate at beginning of the claim
CMA	One if claimant resided in a census metropolitan area, zero otherwise
Nfld	One if claimant resided in Newfoundland, zero otherwise
Maritimes	One if claimant resided in Prince Edward Island, Nova Scotia, or New Brunswick, zero otherwise
Quebec	One if claimant resided in Quebec, zero otherwise
Man-Sask	One if claimant resided in Manitoba or Saskatchewan, zero otherwise
Alberta	One if claimant resided in Alberta, zero otherwise
BC	One if claimant resided in British Columbia, zero otherwise
Ag-For-Fsh	One if claimant worked in agriculture, forestry, or fishing (1980 SIC codes 011 to 033), zero otherwise
Mining	One if claimant worked in mining (1980 SIC codes 061 to 092), zero otherwise
Construction	One if claimant worked in construction (1980 SIC codes 401 to 429 and 441 to 449), zero otherwise
Distrib Serv	One if claimant worked in distributive services (1980 SIC codes 451 to 692), zero otherwise
Non-Mrkt Serv	One if claimant worked in nonmarket services (1980 SIC codes 811 to 869 and 981), zero otherwise
Other Services	One if claimant worked in other services (1980 SIC codes 701 to 779 and 961 to 999), zero otherwise
2nd Quarter	One if claim was initiated in the second quarter of the year, zero otherwise
3rd Quarter	One if claim was initiated in the third quarter of the year, zero otherwise
4th Quarter	One if claim was initiated in the fourth quarter of the year, zero otherwise
FourWeek	One if claim was adjudicated during the period in which the "four week rule" applied (December 1973 through September 1977), zero otherwise

Table A-1 (cont'd.)

	Definition
Benefit Rate/10	Amount of weekly unemployment insurance payments expressed in 1981 dollars and divided by 10
Ben-OverMax	Benefit rate/10 if the claimant's weekly earnings exceeded the maximum insurable earnings, zero otherwise
Past Training	One if claimant participated in a UI-sponsored training or apprenticeship program at some point in the past, zero otherwise
Benefit Weeks/10	Number of weeks of benefits collected
(Benefit Weeks/10)^2	Benefit weeks/10 squared
Spell Count	Sequence number of the claim
Spell Count^2	Spell count squared
Employed > 52	One if number of weeks of insured employment used to support the claim is 52 or greater, zero otherwise

Table A-2

Descriptive statistics of samples used in logit analysis of repeat male UI use

	14 weeks		1 year		5 years	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age/10	3.30	1.26	3.30	1.26	3.28	1.29
$(Age/10)^2$	12.5	9.73	12.5	9.76	12.4	9.97
$(Age/10)^3$	53.3	62.2	53.3	62.4	53.5	63.8
Dependents	0.360		0.328		0.364	
Student	0.112		0.111		0.0979	
U Rate	10.1	4.41	10.1	4.44	9.73	4.44
CMA	0.412		0.417		0.443	
Ontario[1]	0.272		0.272		0.283	
Nfld	0.0628		0.0618		0.0586	
Maritimes	0.101		0.102		0.0997	
Quebec	0.328		0.329		0.333	
Man-Sask	0.0605		0.0595		0.0575	
Alberta	0.0621		0.0619		0.0542	
BC	0.114		0.114		0.114	
Manufacturing[1]	0.167		0.168		0.177	
Ag-For-Fsh	0.278		0.274		0.288	
Mining	0.114		0.119		0.154	
Construction	0.132		0.131		0.111	
Distrib Serv	0.125		0.125		0.117	

Non-Mrkt Services	0.0793		0.0786		0.0698	
Other Services	0.105		0.104		0.0907	
1st Quarter[1]	0.261		0.258		0.258	
2nd Quarter	0.176		0.176		0.179	
3rd Quarter	0.186		0.184		0.183	
4th Quarter	0.377		0.382		0.380	
FourWeek	0.171		0.180		0.241	
Benefit Rate/10	16.8	4.27	16.7	4.21	16.7	3.93
Ben-OverMax	14.3	7.65	14.0	7.70	13.1	8.17
Past Training	0.0854		0.0827		0.0653	
Benefit Weeks/10	2.18	1.41	2.23	1.41	2.18	1.41
(Benefit Weeks/10)^2	6.75	7.21	6.94	7.26	6.74	7.26
Spell Count	3.77	3.17	3.68	3.06	3.12	2.43
Spell Count^2	24.2	42.7	22.9	39.8	15.7	25.5
Employed > 52	0.0878		0.0868		0.0864	
Number	18,114		17,256		12,875	
Number of repeaters	2,761		8,243		9,538	

1 Reference category used in the estimation of the logit models.

Table A-3

Descriptive statistics of samples used in logit analysis of repeat female UI use

	14 weeks		1 year		5 years	
	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age/10	3.31	1.18	3.29	1.18	3.25	1.22
$(Age/10)^2$	12.3	8.92	12.2	8.96	12.0	9.23
$(Age/10)^3$	51.1	56.0	50.7	56.3	50.1	58.3
Dependents	0.219		0.169		0.151	
Student	0.0957		0.0935		0.0803	
U Rate	9.68	3.91	9.70	3.93	9.26	3.88
CMA	0.443		0.450		0.485	
Ontario[1]	0.307		0.310		0.325	
Nfld	0.0465		0.0446		0.0399	
Maritimes	0.0965		0.0963		0.0986	
Quebec	0.323		0.324		0.327	
Man-Sask	0.0569		0.0570		0.0542	
Alberta	0.0603		0.0595		0.0497	
BC	0.110		0.109		0.106	
Manufacturing[1]	0.132		0.134		0.136	
Ag-For-Fsh	0.171		0.164		0.160	
Mining	0.171		0.182		0.259	
Construction	0.0144		0.0138		0.0115	
Distrib Serv	0.132		0.132		0.122	

Non-Mrkt Services	0.181		0.177		0.144	
Other Services	0.199		0.197		0.168	
1st Quarter[1]	0.231		0.232		0.232	
2nd Quarter	0.259		0.255		0.244	
3rd Quarter	0.257		0.253		0.257	
4th Quarter	0.253		0.260		0.267	
FourWeek	0.151		0.161		0.230	
Benefit Rate/10	12.3	4.47	12.2	4.42	12.2	4.23
Ben-OverMax	8.48	7.52	8.21	7.55	6.73	7.68
Past Training	0.0356		0.0328		0.0240	
Benefit Weeks/10	2.48	1.52	2.54	1.52	2.49	1.52
(Benefit Weeks/10)^2	8.45	8.15	8.76	8.24	8.54	8.24
Spell Count	2.95	2.47	2.85	2.36	2.41	1.89
Spell Count^2	14.8	28.7	13.7	26.4	9.35	17.5
Employed > 52	0.105		0.103		0.0959	
Number	11,027		10,359		7,239	
Number of repeaters	1,389		3,832		4,777	

1 Reference category used in the estimation of the logit models.

Table A-4

Logit analysis of repeat male UI use

	14 weeks		1 year		5 years	
Intercept	–2.53	(0.0001)	1.78	(0.0001)	7.51	(0.0000)
Age/10	–2.10	(0.0001)	–4.16	(0.0000)	–6.64	(0.0000)
$(Age/10)^2$	0.544	(0.0002)	1.09	(0.0000)	1.71	(0.0000)
$(Age/10)^3$	–0.0449	(0.0003)	–0.0902	(0.0000)	–0.143	(0.0000)
Dependents	–0.0829	(0.0973)	–0.00568	(0.8870)	0.194	(0.0001)
Student	0.0499	(0.4470)	0.0640	(0.2670)	0.0711	(0.3950)
U Rate	0.0566	(0.0000)	0.0614	(0.0000)	–0.00441	(0.5450)
CMA	–0.0780	(0.1300)	–0.186	(0.0000)	–0.123	(0.0087)
Nfld	0.324	(0.0035)	0.797	(0.0000)	1.29	(0.0000)
Maritimes	0.326	(0.0002)	0.581	(0.0000)	0.666	(0.0000)
Quebec	0.244	(0.0003)	0.277	(0.0000)	0.378	(0.0000)
Man-Sask	0.0901	(0.4290)	0.0472	(0.5450)	0.0195	(0.8390)
Alberta	0.00948	(0.9320)	–0.0459	(0.5490)	–0.0488	(0.6040)
BC	0.322	(0.0001)	–0.0339	(0.5930)	0.0644	(0.3890)
Ag-For-Fsh	–0.0328	(0.6630)	0.191	(0.0022)	0.409	(0.0000)
Mining	–0.0545	(0.6118)	–0.0382	(0.6180)	0.166	(0.0796)
Construction	0.141	(0.0566)	0.136	(0.0340)	0.274	(0.0030)
Distrib Serv	–0.302	(0.0002)	–0.129	(0.0462)	–0.0709	(0.3890)
Non-Mrkt Services	–0.149	(0.0984)	–0.112	(0.1340)	–0.290	(0.0025)
Other Services	–0.0578	(0.4960)	–0.140	(0.0419)	–0.230	(0.0091)

2nd Quarter	−0.300	(0.0000)	−0.231	(0.0000)	−0.157	(0.0149)
3rd Quarter	−0.398	(0.0000)	−0.200	(0.0001)	−0.0268	(0.6840)
4th Quarter	−0.579	(0.0000)	0.0128	(0.7730)	0.00651	(0.9100)
FourWeek	−0.470	(0.0000)	0.230	(0.0000)	−0.228	(0.0011)
Benefit Rate/10	−0.0111	(0.2340)	0.0206	(0.0015)	−0.00400	(0.6430)
Ben-OverMax	0.0220	(0.0002)	−0.00880	(0.0132)	0.00174	(0.6800)
Past Training	−0.215	(0.0047)	−0.295	(0.0000)	−0.0726	(0.4690)
Benefit Weeks/10	2.02	(0.0000)	1.44	(0.0000)	0.774	(0.0000)
(Benefit Weeks/10)^2	−0.364	(0.0000)	−0.284	(0.0000)	−0.157	(0.0000)
Spell Count	0.282	(0.0000)	0.337	(0.0000)	0.435	(0.0000)
Spell Count^2	−0.0148	(0.0000)	−0.0144	(0.0000)	−0.0216	(0.0000)
Employed > 52	−0.0672	(0.4660)	−0.419	(0.0000)	−0.382	(0.0000)
Number of iterations	6		6		6	
ln likelihood	−6,704.13		−10,073.18		−6,471.17	
R^2	0.36		0.39		0.34	
N	18,114		17,256		12,875	
N repeaters	2,761		8,243		9,538	
Prediction rate	85.1		69.0		75.9	
LR (31)	2,057.12		3,741.17		1,791.86	
LR (5)	1,090.49		3,867.08		783.29	

NOTE: Table entries are maximum-likelihood estimates of a logit model. Numbers in parentheses indicate the marginal significance level. LR(31) – likelihood ratio statistic for null that only intercept is nonzero. LR(5) – likelihood ratio statistic for null that last five parameters are zero.

Table A-5

Logit analysis of repeat female UI use

	14 weeks		1 year		5 years	
Intercept	–6.79	(0.0000)	–1.86	(0.0040)	2.37	(0.0008)
Age/10	0.599	(0.2400)	–1.18	(0.0360)	–2.13	(0.0006)
$(Age/10)^2$	–0.118	(0.3510)	0.367	(0.0166)	0.544	(0.0000)
$(Age/10)^3$	0.00748	(0.4570)	–0.0337	(0.0101)	–0.0475	(0.0009)
Dependents	–0.287	(0.0004)	–0.137	(0.0313)	0.00926	(0.9050)
Student	0.0811	(0.3960)	0.224	(0.0045)	0.145	(0.1680)
U Rate	0.145	(0.0000)	0.107	(0.0000)	0.0466	(0.0000)
CMA	–0.124	(0.1080)	–0.197	(0.0001)	–0.0803	(0.1660)
Nfld	–0.0507	(0.7740)	0.464	(0.0015)	0.423	(0.0249)
Maritimes	0.460	(0.0003)	0.511	(0.0000)	0.436	(0.0001)
Quebec	0.429	(0.0000)	0.205	(0.0018)	0.206	(0.0061)
Man-Sask	0.0832	(0.6330)	0.0994	(0.3470)	–0.0209	(0.8610)
Alberta	–0.317	(0.1150)	–0.495	(0.0000)	–0.129	(0.2880)
BC	–0.00315	(0.9810)	–0.202	(0.0241)	–0.104	(0.2780)
Ag-For-Fsh	–0.396	(0.0004)	0.0763	(0.4010)	0.0317	(0.7940)
Mining	–0.616	(0.0001)	–0.1350	(0.1920)	–0.230	(0.0477)
Construction	–0.656	(0.0086)	–0.272	(0.1800)	0.155	(0.5670)
Distrib Serv	–0.994	(0.0000)	–0.470	(0.0000)	–0.3610	(0.0007)
Non-Mrkt Services	–0.480	(0.0000)	–0.0157	(0.8490)	–0.127	(0.2290)
Other Services	–0.755	(0.0000)	–0.350	(0.0000)	–0.283	(0.0053)

2nd Quarter	−0.189	(0.0504)	0.143	(0.0306)	−0.0346	(0.6430)
3rd Quarter	0.0935	(0.3080)	0.0738	(0.2720)	0.0875	(0.2450)
4th Quarter	−0.110	(0.2350)	0.172	(0.0091)	0.100	(0.1830)
FourWeek	−0.171	(0.2330)	0.138	(0.0891)	0.0490	(0.5440)
Benefit Rate/10	−0.0220	(0.1050)	0.000334	(0.9700)	−0.00620	(0.5450)
Ben-OverMax	0.00850	(0.3430)	−0.0111	(0.0513)	−0.000693	(0.9090)
Past Training	0.0212	(0.8840)	−0.0596	(0.6450)	0.227	(0.2640)
Benefit Weeks/10	2.47	(0.0000)	1.18	(0.0000)	0.467	(0.0000)
(Benefit Weeks/10)^2	−0.458	(0.0000)	−0.250	(0.0000)	−0.115	(0.0000)
Spell Count	0.241	(0.0000)	0.262	(0.0000)	0.300	(0.0000)
Spell Count^2	−0.0124	(0.0000)	−0.00594	(0.0418)	−0.00927	(0.1050)
Employed > 52	−0.478	(0.0003)	−0.578	(0.0000)	−0.248	(0.0046)
Number of iterations	7		6		6	
ln likelihood	−3,363.98		−5,767.34		−4,287.59	
R^2	0.43		0.39		0.26	
N	11,027		10,359		7,239	
N repeaters	1,389		3,832		4,777	
Prediction rate	87.9		72.4		67.9	
LR (31)	1,622.58		2,116.68		706.70	
LR (5)	735.1		1,026.06		369.42	

NOTE: Table entries are maximum-likelihood estimates of a logit model. Numbers in parentheses indicate the marginal significance level. LR(31) – likelihood ratio statistic for null that only intercept is nonzero. LR(5) – likelihood ratio statistic for null that last five parameters are zero.

Appendix B

Table B-1

Definitions of variables used in regression analysis of occurrence dependence

Mnemonic	Definition
Age/10	Age in years when claim was initiated divided by 10
$(Age/10)^2$	Age/10 squared
$(Age/10)^3$	Age/10 cubed
Dependents	One if claimant had dependents, zero otherwise
Student	One if claimant was a student, zero otherwise
CMA	One if claimant resided in a census metropolitan area, zero otherwise
2nd Quarter	One if claim was initiated in the second quarter of the year, zero otherwise
3rd Quarter	One if claim was initiated in the third quarter of the year, zero otherwise
4th Quarter	One if claim was initiated in the fourth quarter of the year, zero otherwise
Ag-For-Fsh	One if claimant worked in agriculture, forestry, or fishing (1980 SIC codes 011 to 033), zero otherwise
Mining	One if claimant worked in mining (1980 SIC codes 061 to 092), zero otherwise
Construction	One if claimant worked in construction (1980 SIC codes 401 to 429 and 441 to 449), zero otherwise
Distrib Serv	One if claimant worked in distributive services (1980 SIC codes 451 to 692), zero otherwise
Non-Mrkt Serv	One if claimant worked in nonmarket services (1980 SIC codes 811 to 869 and 981), zero otherwise
Other Services	One if claimant worked in other services (1980 SIC codes 701 to 779 and 961 to 999), zero otherwise
Nfld	One if claimant resided in Newfoundland, zero otherwise
Maritimes	One if claimant resided in Prince Edward Island, Nova Scotia, or New Brunswick, zero otherwise
Quebec	One if claimant resided in Quebec, zero otherwise
Man-Sask	One if claimant resided in Manitoba or Saskatchewan, zero otherwise
Alberta	One if claimant resided in Alberta, zero otherwise
BC	One if claimant resided in British Columbia, zero otherwise
BE Rate	Amount of weekly unemployment insurance payments divided by weekly insured earnings
BE Rate OverMax	BE rate if insured earnings exceeded maximum insured earnings, zero otherwise
Maximum Benefit Weeks	Number of weeks of benefit eligibility

Table B-1 (cont'd.)

	Definition
Supplementary inc	One if claimant received supplementary unemployment insurance benefits or pension income, zero otherwise
FourWeek	One if claim was adjudicated during the period in which the "four week rule" applied (December 1975 through September 1977), zero otherwise
U Rate	Regional unemployment rate at beginning of the claim
DAge	Age/10 during $n+1$ spell less Age/10 during n^{th} spell
DAge^2	(Age/10)^2 during $n+1$ spell less (Age/10)^2 during n^{th} spell
DAge^3	(Age/10)^3 during $n+1$ spell less (Age/10)^3 during n^{th} spell
DDependents	One if Dependents changes between $n+1$ and n^{th} spell, zero otherwise
DStudent	One if Student changes between $n+1$ and n^{th} spell, zero otherwise
DCMA	One if CMA changes between $n+1$ and n^{th} spell, zero otherwise
DQuarter	One if 2nd Quarter, 3rd Quarter, or 4th Quarter changes between $n+1$ and n^{th} spell, zero otherwise
DIndustry	One if Ag-For-Fsh, Mining, Construction, Non-Mrkt Services, Other Services, or Disbrib Services changes between $n+1$ and n^{th} spell, zero otherwise
DRegion	One if Nfld, Maritimes, Quebec, Man-Sask, Alberta, or BC changes between $n+1$ and n^{th} spell, zero otherwise
DBE Rate	BE Rate for $n+1$ spell less BE Rate for n^{th} spell
DMax Benefit Wks	Maximum Benefit Weeks for $n+1$ spell less Maximum Benefit Weeks for n^{th} spell
DBE Rate OverMax	Ben-OverMax for $n+1$ spell less Ben-OverMax for n^{th} spell
DSup Inc	One if Supplementary Inc changes between $n+1$ and n^{th} spell, zero otherwise
DFourWeek	One if FourWeek changes between $n+1$ and n^{th} spell, zero otherwise
DU Rate	U Rate for $n+1$ spell less U Rate for n^{th} spell

Table B-2

Least squares regression tests of mean occurrence dependence, male subsample, benefit weeks paid and duration of claim

	Benefit weeks paid				Duration of claim			
	All spells		First-second spells		All spells		First-second spells	
Intercept	–0.697	(0.0001)	–0.348	(0.2696)	–0.842	(0.0001)	–0.430	(0.1078)
Age/10	–0.541	(0.0001)	–0.518	(0.0001)	–0.628	(0.0001)	–0.813	(0.0001)
$(Age/10)^2$	0.146	(0.0001)	0.147	(0.0001)	0.187	(0.0001)	0.253	(0.0001)
$(Age/10)^3$	–0.0122	(0.0001)	–0.0128	(0.0001)	–0.0170	(0.0001)	–0.0238	(0.0001)
Dependents	–0.0741	(0.0001)	–0.0381	(0.0220)	–0.0791	(0.0001)	–0.0330	(0.0195)
Student	0.00508	(0.5881)	0.0330	(0.2028)	–0.0219	(0.0065)	–0.0194	(0.3786)
CMA	0.0274	(0.0001)	0.00561	(0.6819)	0.0188	(0.0005)	0.0177	(0.1282)
2nd Quarter	–0.0310	(0.0004)	–0.0187	(0.2930)	–0.0319	(0.0001)	–0.0300	(0.0459)
3rd Quarter	–0.108	(0.0001)	–0.0809	(0.0001)	–0.0755	(0.0001)	–0.0528	(0.0006)
4th Quarter	–0.116	(0.0001)	–0.132	(0.0001)	–0.0282	(0.0001)	–0.0546	(0.0001)
Ag-For-Fsh	–0.0861	(0.0001)	–0.0456	(0.1034)	–0.0580	(0.0001)	–0.0132	(0.5780)
Mining	–0.0790	(0.0001)	–0.0362	(0.2331)	–0.0661	(0.0001)	–0.0178	(0.4886)
Construction	–0.0521	(0.0001)	0.00342	(0.9128)	–0.0109	(0.2100)	0.0230	(0.3853)
Non-Mrkt Services	–0.0369	(0.0037)	–0.0313	(0.3687)	–0.00943	(0.3870)	0.0101	(0.7318)
Other Services	–0.0306	(0.0086)	–0.0211	(0.4587)	–0.00311	(0.7556)	0.0160	(0.5071)
Distrib Serv	–0.0230	(0.0322)	–0.00907	(0.7279)	0.00373	(0.6858)	0.0101	(0.6467)
Nfld	0.0304	(0.0582)	0.0620	(0.1639)	0.0163	(0.2366)	0.0298	(0.4302)
Maritimes	–0.00999	(0.3716)	–0.0116	(0.6701)	0.000248	(0.9794)	0.00216	(0.9255)
Quebec	–0.0222	(0.0088)	–0.0170	(0.3688)	–0.00696	(0.3373)	0.0193	(0.2269)
Man-Sask	0.0123	(0.3469)	0.00612	(0.8231)	0.0129	(0.2506)	0.0135	(0.5623)
Alberta	0.0418	(0.0011)	0.0215	(0.4103)	0.0299	(0.0067)	0.00335	(0.8795)

BC	0.00103	(0.9226)	0.0339	(0.1424)	−0.00739	(0.4156)	0.0113	(0.5655)
BE Rate	1.57	(0.0001)	1.06	(0.0142)	1.80	(0.0001)	1.44	(0.0001)
BE Rate-OverMax	−0.0536	(0.0030)	−0.0209	(0.5394)	−0.0713	(0.0001)	−0.0466	(0.1058)
Maximum Benefit Wks	0.0130	(0.0001)	0.0106	(0.0001)	0.00975	(0.0001)	0.00950	(0.0001)
Supplementary Inc	−0.0468	(0.0365)	−0.112	(0.1184)	−0.251	(0.0001)	−0.380	(0.0001)
Four Week	0.0630	(0.0001)	0.0150	(0.5650)	0.0925	(0.0001)	0.0130	(0.5566)
U Rate	−0.00925	(0.0001)	−0.0131	(0.0001)	−0.00346	(0.0005)	−0.00960	(0.0004)
DAge	−1.64	(0.0001)	−1.71	(0.0001)	−1.15	(0.0001)	−1.16	(0.0001)
$DAge^2$	0.380	(0.0001)	0.437	(0.0001)	0.304	(0.0001)	0.340	(0.0001)
$DAge^3$	−0.0277	(0.0001)	−0.0335	(0.0001)	−0.0254	(0.0001)	−0.0296	(0.0001)
DDependents	0.0173	(0.0093)	−0.0217	(0.1666)	0.0321	(0.0001)	−0.00851	(0.5225)
DStudent	−0.00803	(0.4318)	−0.0294	(0.2295)	0.0150	(0.0860)	0.0275	(0.1840)
DCMA	0.0630	(0.0001)	0.0552	(0.0028)	0.0768	(0.0001)	0.0570	(0.0003)
DQuarter	−0.00859	(0.1426)	−0.00836	(0.5224)	0.0598	(0.0001)	0.0462	(0.0001)
DIndustry	−0.0886	(0.0001)	−0.0843	(0.0001)	−0.0764	(0.0001)	−0.0851	(0.0001)
DRegion	0.0772	(0.0001)	0.0629	(0.0367)	0.0750	(0.0001)	0.0466	(0.0680)
DBE Rate	−1.02	(0.0001)	−1.62	(0.0001)	−0.700	(0.0001)	−1.18	(0.0003)
DMax Benefit Wks	0.0267	(0.0001)	0.0246	(0.0001)	0.0245	(0.0001)	0.0239	(0.0001)
DBE Rate OverMax	0.205	(0.0001)	0.189	(0.0001)	0.155	(0.0001)	0.151	(0.0001)
DSup Inc	0.0389	(0.0133)	0.0661	(0.1099)	0.106	(0.0001)	0.161	(0.0001)
DFour Week	−0.133	(0.0001)	−0.129	(0.0001)	−0.181	(0.0001)	−0.184	(0.0001)
DU Rate	0.0145	(0.0001)	0.0215	(0.0001)	0.00957	(0.0001)	0.0138	(0.0001)
R^2	0.0512		0.0537		0.0680		0.0743	
N	142,912		36,891		142,912		36,891	
$F(43)$	183.4	(0.0001)	49.8	(0.0001)	248.1	(0.0001)	70.4	(0.0001)
$F(28)$	50.1	(0.0001)	7.53	(0.0001)	67.9	(0.0001)	12.0	(0.0001)

Note Numbers in parentheses indicate the marginal significance level.

Table B-3

Least squares regression tests of mean occurrence dependence, young male subsample, benefit weeks paid and duration of claim

	Benefit weeks paid				Duration of claim			
	All spells		First-second spells		All spells		First-second spells	
Intercept	2.62	(0.0013)	2.89	(0.0190)	2.47	(0.0003)	2.31	(0.0252)
Age/10	–3.10	(0.0019)	–1.76	(0.2713)	–2.88	(0.0006)	–1.40	(0.2992)
$(Age/10)^2$	1.47	(0.0007)	0.628	(0.4106)	1.37	(0.0002)	0.486	(0.4475)
$(Age/10)^3$	–0.241	(0.0001)	–0.0834	(0.4905)	–0.221	(0.0001)	–0.0661	(0.5147)
Dependents	–0.348	(0.0001)	–0.293	(0.0001)	–0.359	(0.0001)	–0.329	(0.0001)
Student	0.0108	(0.4796)	0.0268	(0.3895)	–0.00380	(0.7682)	–0.0193	(0.4611)
CMA	0.0331	(0.0030)	0.0116	(0.5740)	0.0283	(0.0027)	0.0321	(0.0633)
2nd Quarter	–0.0115	(0.4472)	0.0294	(0.2825)	–0.0199	(0.1183)	0.0140	(0.5412)
3rd Quarter	–0.106	(0.0001)	–0.0813	(0.0035)	–0.0762	(0.0001)	–0.0412	(0.0775)
4th Quarter	–0.117	(0.0001)	–0.133	(0.0001)	–0.0300	(0.0044)	–0.0346	(0.0884)
Ag-For-Fsh	–0.0849	(0.0001)	–0.0819	(0.0250)	–0.0786	(0.0001)	–0.0911	(0.0029)
Mining	–0.0772	(0.0020)	–0.106	(0.0156)	–0.0763	(0.0003)	–0.110	(0.0030)
Construction	–0.0536	(0.0012)	0.0108	(0.7697)	–0.0256	(0.0678)	0.00409	(0.8946)
Non-Mrkt Services	–0.0230	(0.1409)	–0.00399	(0.9238)	–0.00973	(0.5713)	0.0204	(0.5593)
Other Services	–0.0377	(0.0317)	–0.0416	(0.2155)	–0.0238	(0.1074)	–0.0235	(0.4049)
Distrib Serv	–0.00873	(0.5865)	–0.00977	(0.7534)	–0.00437	(0.7469)	–0.0195	(0.4548)
Nfld	0.0444	(0.1080)	0.0115	(0.8469)	0.0110	(0.6362)	–0.0200	(0.6897)
Maritimes	0.0230	(0.2387)	0.00565	(0.8857)	0.0200	(0.2264)	0.0237	(0.4722)
Quebec	–0.0197	(0.1910)	–0.00828	(0.7690)	–0.0119	(0.3486)	–0.00419	(0.8593)
Man-Sask	0.0486	(0.0243)	0.0990	(0.0110)	0.0433	(0.0174)	0.0873	(0.0075)
Alberta	0.0584	(0.0062)	0.0536	(0.1598)	0.0304	(0.0912)	0.0445	(0.1640)

BC	0.00327	(0.8646)	0.0691	(0.0497)	−0.0122	(0.4509)	0.0230	(0.4365)
BE Rate	−0.884	(0.0394)	−1.99	(0.0037)	−1.09	(0.0027)	−1.87	(0.0012)
BE Rate-OverMax	−0.0822	(0.0381)	−0.207	(0.0005)	−0.0625	(0.0620)	−0.182	(0.0002)
Maximum Benefit Wks	0.00996	(0.0001)	−0.00732	(0.0003)	0.00710	(0.0001)	0.00719	(0.0001)
Supplementary Inc	0.0142	(0.6823)	0.0435	(0.6032)	−0.259	(0.0001)	−0.312	(0.0001)
Four Week	0.116	(0.0030)	0.115	(0.0427)	0.165	(0.0001)	0.142	(0.0028)
U Rate	−0.00792	(0.0001)	−0.00631	(0.1261)	−0.000243	(0.8822)	−0.00256	(0.4598)
DAge	−2.20	(0.0001)	−3.58	(0.0001)	−1.63	(0.0001)	−2.37	(0.0001)
$DAge^2$	0.416	(0.0001)	0.831	(0.0001)	0.305	(0.0001)	0.527	(0.0001)
$DAge^3$	−0.0222	(0.0001)	−0.0515	(0.0001)	−0.0163	(0.0001)	−0.0320	(0.0001)
DDependents	0.0873	(0.0001)	0.0231	(0.3827)	0.0104	(0.0001)	0.0600	(0.0068)
DStudent	0.0354	(0.0418)	0.0303	(0.3557)	0.0324	(0.0270)	0.0572	(0.0378)
DCMA	0.0711	(0.0001)	0.0762	(0.0100)	0.0713	(0.0001)	0.0684	(0.0058)
DQuarter	−0.0300	(0.0038)	−0.0354	(0.0716)	0.0633	(0.0001)	0.0656	(0.0001)
DIndustry	−0.0884	(0.0001)	−0.0824	(0.0001)	−0.0653	(0.0001)	−0.0846	(0.0001)
DRegion	0.0692	(0.0077)	0.0596	(0.1774)	0.0699	(0.0014)	0.0547	(0.1402)
DBE Rate	−2.75	(0.0001)	−4.05	(0.0001)	−3.13	(0.0001)	−3.79	(0.0001)
DMax Benefit Wks	0.0269	(0.0001)	0.0250	(0.0001)	0.0243	(0.0001)	0.0248	(0.0001)
DBE Rate OverMax	0.213	(0.0001)	0.112	(0.0322)	0.154	(0.0001)	0.0702	(0.1089)
DSup Inc	0.00723	(0.7658)	−0.0610	(0.2495)	0.121	(0.0001)	0.108	(0.0154)
DFour Week	−0.186	(0.0001)	−0.191	(0.0001)	−0.243	(0.0001)	−0.268	(0.0001)
DU Rate	0.0152	(0.0001)	0.0210	(0.0001)	0.0117	(0.0001)	0.0145	(0.0001)
R^2	0.0631		0.0631		0.0785		0.0847	
N	46,290		14,993		46,290		14,993	
$F(43)$	74.2	(0.0001)	24.0	(0.0001)	93.8	(0.0001)	32.9	(0.0001)
$F(28)$	35.5	(0.0001)	6.41	(0.0001)	49.8	(0.0001)	8.38	(0.0001)

Note: Numbers in parentheses indicate the marginal significance level.

Table B-4

Least squares regression tests of mean occurrence dependence, female subsample, benefit weeks paid and duration of claim

	Benefit weeks paid				Duration of claim			
	All spells		First-second spells		All spells		First-second spells	
Intercept	–0.293	(0.1599)	–0.662	(0.0552)	–0.630	(0.0003)	–0.661	(0.0198)
Age/10	–0.866	(0.0001)	–0.710	(0.0001)	–0.888	(0.0001)	–0.800	(0.0001)
$(Age/10)^2$	0.206	(0.0001)	0.174	(0.0001)	0.235	(0.0001)	0.222	(0.0001)
$(Age/10)^3$	–0.0157	(0.0001)	–0.0138	(0.0001)	–0.0199	(0.0001)	–0.0196	(0.0001)
Dependents	–0.127	(0.0001)	–0.0379	(0.0836)	–0.142	(0.0001)	–0.0320	(0.0753)
Student	–0.0289	(0.0439)	–0.00340	(0.9080)	–0.0307	(0.0102)	–0.0116	(0.6325)
CMA	0.0471	(0.0001)	0.0503	(0.0003)	0.0346	(0.0001)	0.0434	(0.0002)
2nd Quarter	0.0137	(0.1825)	0.0344	(0.0480)	0.0162	(0.0585)	0.0224	(0.1165)
3rd Quarter	–0.0121	(0.2469)	–0.00147	(0.9345)	–0.0108	(0.2133)	–0.00885	(0.5470)
4th Quarter	–0.0504	(0.0001)	–0.0336	(0.0634)	–0.0190	(0.0227)	–0.0136	(0.3612)
Ag-For-Fsh	–0.0854	(0.0001)	–0.0768	(0.0229)	–0.0675	(0.0001)	–0.0233	(0.3999)
Mining	–0.0601	(0.0007)	–0.0399	(0.2421)	–0.0583	(0.0001)	–0.00382	(0.8916)
Construction	–0.0298	(0.3816)	0.0893	(0.2522)	0.00931	(0.7426)	0.105	(0.0997)
Non-Mrkt Services	–0.0783	(0.0001)	–0.0559	(0.0576)	–0.0485	(0.0001)	–0.0327	(0.1764)
Other Services	–0.0383	(0.0039)	–0.0323	(0.2513)	–0.0185	(0.0941)	–0.0185	(0.4234)
Distrib Serv	–0.0251	(0.0856)	–0.0491	(0.1042)	–0.00653	(0.5906)	–0.0142	(0.5661)
Nfld	–0.0313	(0.1851)	0.0120	(0.8053)	–0.0324	(0.0993)	–0.00209	(0.9582)
Maritimes	–0.0520	(0.0006)	0.0110	(0.7015)	–0.0374	(0.0029)	0.0174	(0.4587)
Quebec	–0.0536	(0.0001)	–0.00515	(0.7864)	–0.0403	(0.0001)	0.0125	(0.4222)
Man-Sask	–0.0148	(0.3974)	–0.0325	(0.2467)	–0.0197	(0.1754)	–0.0233	(0.3124)
Alberta	0.0236	(0.1688)	0.0304	(0.2565)	0.0116	(0.4157)	0.0333	(0.1303)

BC	−0.0210	(0.1271)	0.00363	(0.8789)	−0.0282	(0.0138)	0.00445	(0.8202)
BE Rate	1.56	(0.0001)	1.91	(0.0001)	2.00	(0.0001)	1.84	(0.0001)
BE Rate-OverMax	0.0552	(0.0029)	0.0972	(0.0033)	0.0162	(0.2944)	0.0408	(0.1331)
Maximum Benefit Wks	0.0159	(0.0001)	0.0145	(0.0001)	0.0126	(0.0001)	0.0124	(0.0001)
Supplementary Inc	−0.0568	(0.0437)	−0.0712	(0.3285)	−0.299	(0.0001)	−0.327	(0.0001)
Four Week	0.0177	(0.3785)	−0.0169	(0.5668)	0.0221	(0.1866)	−0.0285	(0.2403)
U Rate	−0.0118	(0.0001)	−0.0180	(0.0001)	−0.00585	(0.0001)	−0.0113	(0.0001)
DAge	−1.18	(0.0001)	−0.933	(0.0001)	−1.29	(0.0001)	−1.15	(0.0001)
DAge^2	0.217	(0.0001)	0.179	(0.0003)	0.292	(0.0001)	0.268	(0.0001)
DAge^3	−0.0151	(0.0001)	−0.0133	(0.0005)	−0.0235	(0.0001)	−0.0223	(0.0001)
DDependents	0.0217	(0.0118)	0.0166	(0.3058)	0.0408	(0.0001)	0.0213	(0.1089)
DStudent	−0.00191	(0.8960)	0.00373	(0.8875)	0.00704	(0.5641)	0.0191	(0.3769)
DCMA	0.926	(0.0001)	0.0781	(0.0001)	0.0957	(0.0001)	0.0893	(0.0001)
DQuarter	−0.00844	(0.2646)	−0.0176	(0.1946)	0.0461	(0.0001)	0.0317	(0.0045)
DIndustry	−0.126	(0.0001)	−0.107	(0.0001)	−0.110	(0.0001)	−0.102	(0.0001)
DRegion	0.0918	(0.0001)	0.0863	(0.0024)	0.0763	(0.0001)	0.0824	(0.0004)
DBE Rate	0.0897	(0.7080)	0.614	(0.1056)	0.543	(0.0064)	0.606	(0.0522)
DMax Benefit Wks	0.0272	(0.0001)	0.0271	(0.0001)	0.0244	(0.0001)	0.0247	(0.0001)
DBE Rate OverMax	0.306	(0.0001)	0.313	(0.0001)	0.203	(0.0001)	0.207	(0.0001)
DSup Inc	0.0135	(0.4645)	0.0412	(0.2771)	0.103	(0.0001)	0.133	(0.0001)
DFour Week	−0.170	(0.0001)	−0.184	(0.0001)	−0.203	(0.0001)	−0.215	(0.0001)
DU Rate	0.00783	(0.0001)	0.00244	(0.3400)	0.00775	(0.0001)	0.00179	(0.3959)
R^2	0.0516		0.0484		0.0665		0.0630	
N	87,106		32,368		87,106		32,368	
F(43)	112.9	(0.0001)	39.2	(0.0001)	147.6	(0.0001)	51.8	(0.0001)
F(28)	39.9	(0.0001)	12.9	(0.0001)	48.7	(0.0001)	12.9	(0.0001)

NOTE: Numbers in parentheses indicate the marginal significance level.

Table B-5

Least squares regression tests of mean occurrence dependence, young female subsample, benefit weeks paid and duration of claim

	Benefit weeks paid				Duration of claim			
	All spells		First-second spells		All spells		First-second spells	
Intercept	1.55	(0.2848)	3.15	(0.1784)	3.58	(0.0023)	6.76	(0.0003)
Age/10	–3.50	(0.0459)	–6.36	(0.0345)	–6.03	(0.0001)	–10.7	(0.0001)
$(Age/10)^2$	1.69	(0.0242)	3.07	(0.0225)	2.76	(0.0001)	4.97	(0.0001)
$(Age/10)^3$	–0.274	(0.0098)	–0.491	(0.0137)	–0.420	(0.0001)	–0.754	(0.0001)
Dependents	–0.215	(0.0001)	–0.115	(0.0030)	–0.229	(0.0001)	–0.111	(0.0004)
Student	0.00622	(0.7892)	0.0555	(0.1655)	0.000498	(0.9790)	0.0505	(0.1182)
CMA	0.0542	(0.0003)	0.0664	(0.0037)	0.0409	(0.0007)	0.0564	(0.0023)
2nd Quarter	0.0130	(0.4731)	0.0195	(0.4925)	0.00223	(0.8802)	–0.00485	(0.8319)
3rd Quarter	–0.0498	(0.0068)	–0.0405	(0.1656)	–0.0446	(0.0028)	–0.0461	(0.0506)
4th Quarter	–0.0819	(0.0001)	–0.0670	(0.0215)	–0.0499	(0.0009)	–0.0495	(0.0352)
Ag-For-Fsh	–0.0714	(0.0102)	–0.123	(0.0126)	–0.0718	(0.0015)	–0.0882	(0.0269)
Mining	–0.0563	(0.1468)	–0.115	(0.0446)	–0.0577	(0.0674)	–0.0845	(0.0662)
Construction	–0.0793	(0.1459)	0.0376	(0.7059)	–0.0256	(0.5635)	0.0425	(0.5969)
Non-Mrkt Services	–0.0406	(0.0749)	–0.0440	(0.2685)	–0.0348	(0.0601)	–0.0340	(0.2893)
Other Services	–0.00495	(0.8147)	0.00289	(0.9361)	–0.000323	(0.9850)	0.00705	(0.8083)
Distrib Serv	0.00445	(0.8483)	–0.0216	(0.5765)	0.0130	(0.4930)	0.0211	(0.4991)
Nfld	–0.0808	(0.0455)	–0.0752	(0.2895)	–0.0845	(0.0101)	–0.0840	(0.1429)
Maritimes	–0.0894	(0.0011)	–0.0279	(0.5393)	–0.0740	(0.0009)	–0.0270	(0.4615)
Quebec	–0.0101	(0.0001)	–0.0461	(0.1338)	–0.0854	(0.0001)	–0.0335	(0.1769)
Man-Sask	–0.0474	(0.1192)	–0.0604	(0.1659)	–0.0557	(0.0242)	–0.0505	(0.1511)
Alberta	0.00711	(0.8107)	–0.0271	(0.5224)	–0.00219	(0.9277)	0.0279	(0.4146)

BC	−0.0328	(0.1934)	−0.0115	(0.7706)	−0.0512	(0.0125)	−0.0119	(0.7083)
BE Rate	0.838	(0.1979)	1.67	(0.0600)	0.667	(0.2076)	1.06	(0.1391)
BE Rate-OverMax	0.162	(0.0001)	0.178	(0.0020)	0.125	(0.0001)	0.122	(0.0084)
Maximum Benefit Wks	0.0141	(0.0001)	0.00896	(0.0002)	0.0102	(0.0001)	0.00728	(0.0002)
Supplementary Inc	0.00921	(0.8344)	0.0316	(0.7184)	−0.238	(0.0001)	−0.213	(0.0027)
Four Week	0.110	(0.0723)	0.125	(0.1087)	0.118	(0.0180)	0.125	(0.0465)
U Rate	−0.0111	(0.0001)	−0.0108	(0.0216)	−0.00334	(0.1362)	−0.00378	(0.3174)
DAge	−0.584	(0.4260)	−1.38	(0.2688)	−0.781	(0.1904)	−0.915	(0.3616)
DAge^2	−0.0564	(0.8083)	0.226	(0.5944)	0.0361	(0.8485)	0.0831	(0.8081)
DAge^3	0.0184	(0.4276)	−0.00703	(0.8801)	0.00851	(0.6511)	0.00692	(0.8541)
DDependents	0.0365	(0.0171)	0.00913	(0.7234)	0.0579	(0.0001)	0.0101	(0.6261)
DStudent	−0.0224	(0.3674)	−0.0491	(0.2188)	−0.00422	(0.8347)	−0.0131	(0.6851)
DCMA	0.107	(0.0001)	0.0918	(0.0027)	0.107	(0.0001)	0.107	(0.0001)
DQuarter	0.0132	(0.3343)	0.00847	(0.7020)	0.0842	(0.0001)	0.0899	(0.0001)
DIndustry	−0.100	(0.0001)	−0.0514	(0.0225)	−0.0888	(0.0001)	−0.0630	(0.0005)
DRegion	0.0818	(0.0087)	0.123	(0.0056)	0.0887	(0.0005)	0.128	(0.0004)
DBE Rate	−0.944	(0.1251)	−0.422	(0.6059)	−0.932	(0.0624)	−0.714	(0.2789)
DMax Benefit Wks	0.0277	(0.0001)	0.0269	(0.0001)	0.0247	(0.0001)	0.0246	(0.0001)
DBE Rate OverMax	0.437	(0.0001)	0.386	(0.0001)	0.302	(0.0001)	0.255	(0.0001)
DSup Inc	−0.0200	(0.4900)	0.00982	(0.8454)	0.0876	(0.0002)	0.102	(0.0123)
DFour Week	−0.143	(0.0069)	−0.116	(0.0711)	−0.208	(0.0001)	−0.198	(0.0001)
DU Rate	0.00823	(0.0008)	0.00296	(0.4554)	0.00837	(0.0001)	0.00209	(0.5126)
R^2	0.0591		0.0521		0.0744		0.0702	
N	27,586		12,0001		27,586		12,001	
$F(43)$	41.2	(0.0001)	15.7	(0.0001)	52.7	(0.0001)	21.5	(0.0001)
$F(28)$	16.3	(0.0001)	4.29	(0.0001)	20.3	(0.0001)	4.09	(0.0001)

Note: Numbers in parentheses indicate the marginal significance level.

Notes

1 This abstracts from considerations of life-cycle labour supply.

2 Sociologists refer to such a framework as "path analysis," while it enters macroeconomists' lexicon as "hysteresis."

3 "State dependence" in the receipt of unemployment insurance might reasonably be considered to contribute to the microeconomic underpinnings of aggregate models of hysteresis. The hysteresis literature has not paid a great deal of attention to the role of unemployment insurance. Blanchard and Summers [1986], for example, discuss various microeconomic explanations of hysteresis but introduce the possible influence of unemployment insurance only in a footnote. Milbourne, Purvis, and Scoones [1990] is one exception. Their model is based upon endogenous changes in the constraints that individual labour market participants face.

4 This interpretation assumes that "active" payments are in fact effective in bringing about the changes that their proponents claim for them. This issue of efficacy is touched upon only tangentially in the current paper. It would have to be addressed in detail before policy recommendations could be put forward with any degree of confidence. To date this has not been done in the Canadian literature.

5 The data for 1971 are excluded from the figure, since the program only came into being half way through the year. Also excluded are the data for 1990, because the sample endpoint occurs in March of that year.

6 Levesque [1987, 1989] explores the relationship between UI administrative data and the number of unemployed as determined by the Labour Force Survey. He finds that with some modifications in both data sets and for some demographic groups the resulting totals are very similar.

7 It should be underscored that the categorizations are based upon the industry and region of the first claim. Subsequent claims could have been supported by employment in a different industry or could have taken place in a different region. The following discussion should be interpreted in this light and is intended in an indicative sense.

8 It is interesting to note that, in spite of this conclusion, a great deal of attention has been devoted to the study of duration dependence. One particularly pertinent example is Ham and Rea [1987]. They use the same data set as we do to examine the duration of time spent on unemployment insurance by Canadian males, focusing upon duration dependence and to a slightly lesser extent lagged-duration dependence. Occurrence dependence has not been examined with Canadian data.

9 The number of insured weeks of employment used to support the claim is available. This does not necessarily represent the total time spent employed before the claim, for several reasons. First, it records only the period of "insured" employment used to support the claim, and, second, its maximum value is 52 weeks. The duration of insured employment is used in the calculation of the duration of benefits. Since benefit entitlement is limited, the data only records the length of employment up to the point that it implies maximum benefit eligibility – namely 52 weeks – and not beyond.

10 There have been attempts to merge the Status Vector records with other administrative data – notably information from tax files and from the Record of Employment – in the hope of obtaining a complete longitudinal history of individual labour force behaviour. Corak [1988] has reviewed this work and finds that there are considerable limitations associated with such attempts.

11 Developmental claims, which are used to provide income payments to claimants on an approved training course or a job creation project, are employed to derive an indicator variable of whether or not the individual experienced UI-sponsored training. This information is attached to regular or fishing claims that the individual may have but are otherwise excluded from the analysis.

12 The SAS procedure LOGIST was used in performing the estimation with a convergence criterion of 0.025.

13 The diagnostics presented in these tables require comment. R^2 is not the standard multiple correlation coefficient of least squares regression but McFadden's R^2 adjusted for the degrees of freedom [Amemiya 1981]. The predication rate refers to the fraction of the sample that is correctly classified by the model as being repeaters or non-repeaters. It is derived by using the predicted probabilities from the model and classifying the claimant as a repeater if this probability is equal to or above 0.5 and a non-repeater if it is below. For example, a predication rate of 85.1 per cent for the case of 14-week male repeaters implies that 85.1 per cent of the sample was, in this manner, correctly classified by the model. LR(31) is the likelihood ratio statistic for the null hypothesis that the only significant regressor is the constant, while LR(5) is a likelihood ratio statistic for the null that the last five regressors listed in the model – those associated with the individual's past labour-force history – are collectively equal to zero. These test statistics lead to the rejection of the null hypotheses in all cases.

14 The continuous variables take on the following values: age – 33 years; unemployment rate – 10 per cent; benefit rate – $167; Ben-OverMax – $140;

and benefit weeks – 22. These are roughly equal to the sample averages. They are chosen to be the same for both genders and all of the models. Thus the differences in the predicted results reflect only the differences between the estimated parameter values. It is well known that the marginal impact of changes in regressors on the probabilities derived from a logit model depend upon the value of the regressors themselves. This follows from the non-linearity of the functional form. The sample average seems as good a place as any to anchor Tables 8 and 9.

15 There is a large literature on the evaluation of training programs, which is reviewed in part by Riddell [1990].

16 Corak [1991], for example, offers an analysis of spell durations from a similar data set that employs a measure in which spells are defined to end with the first week in which the individual earns sufficient employment income to reduce benefit payments to zero. This definition is probably much closer to the duration of an unemployment spell and falls somewhere between the present definitions.

17 The decision by Heckman and Borjas to focus upon high-school graduates is motivated by the same reasoning: since the analysis is concerned with the influence of an individual's labour force history on his or her current situation, it is important to fully control for the past.

18 The finding that the young generally have longer UI spells than the old contrasts with the general view concerning the duration of unemployment spells. It has been observed that the young have shorter unemployment spells than the old. That the opposite seems to be the case in our data reflects, most likely, the patterns of usage of the UI program. Young individuals are more likely to take jobs that are short-term or part-time and then return to their claims to collect any outstanding benefits. This would both increase the duration of the claim and the number of weeks of benefits paid. Older individuals may be more inclined to search for more permanent/career jobs. Once they find such jobs, they might tend to let any remaining entitlement on a claim lapse.

19 A referee has argued that it may not be appropriate to argue that changes in individual characteristics are exogenous, that $\Delta X = 0$. Some of the change in circumstances may reflect an individual's efforts to improve his or her situation, and the availability of unemployment insurance could facilitate these efforts by permitting longer periods of search and possibly a better match between worker and employer. Accordingly, the change in variables such as industry, province, census metropolitan area, and student status should not necessarily be set to zero. This argument seems more directly related to the incidence of subsequent spells – as examined

in the previous section – rather than their duration. Even so, as a response to this suggestion we derived a second set of results in which DStudent, DCMA, DQuarter, DIndustry, DRegion, and DDependents in Appendix B are set to their sample means, while the remaining changing variables are set to zero. The results are as follows:

	Benefits paid	Claim duration
	(Weeks)	
Males		
All spells	1.08	1.02
First-second spells	1.11	1.00
Young males		
All spells	1.12	1.05
First-second spells	1.11	1.02
Females		
All spells	1.10	1.02
First-second spells	1.12	1.05
Young females		
All spells	1.23	1.16
First-second spells	2.34	1.10

The difference between these results and those obtained by setting all of the changing variables to zero is not substantial; at times these are slightly lower, and at times they are slightly greater.

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